

APPENDIX 3 - ATTACHMENT 3B

Specifications and Technical Data Forms

Design-Build-Operate Project Development Reverse Osmosis Water Treatment Plant

For

The City of Hialeah, Florida



By

Parsons

Water & Infrastructure Inc.

OCTOBER 2009

HIALEAH RO WATER TREATMENT PLANT TECHNICAL SPECIFICATION

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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

- A. Work of this Service Contract includes the detailed design, construction and operation associated with Production Well pumping housing and equipment stations (PWP), Reverse Osmosis Brackish Water Treatment Plant (Project), the Raw Water main between the connection point and the Facility, and the Finished Water main between the Finished Water Storage Tanks and the flow measurement and control stations, and the sewage force main between the Facility and the fence line.
- B. The Project is anticipated to include, but not be limited to, the following components:
- Raw Water Pretreatment including sulfuric acid storage and feed system, anti-scalant storage and feed system, in-line static mixers, and cartridge filtration;
 - High pressure RO feed pumps and flow control features;
 - RO membrane skid equipment, including energy recovery equipment;
 - Permanent Clean-in-place system for cleaning and maintenance of the membranes, including citric acid storage and feed system, sodium metabisulfite storage and feed system, permeate rinse system;
 - H₂S Degasifier and odor control scrubber equipment;
 - Other chemical storage and feed systems, including carbon dioxide storage and carbonic acid solution feed system; hydrated lime storage and dilution, saturation, and feed system; sodium hydroxide storage and feed system; hydrofluorosilicic acid storage and feed system; corrosion inhibitor(ortho- and poly- phosphate blend) storage and feed system; sodium hypochlorite storage and feed system; aqueous ammonia storage and feed system;
 - Intermediate pumping station and wet well;
 - Pre-stressed concrete ground storage tanks;
 - High service pumping station;
 - Yard piping to the limits of the project site as indicated elsewhere in the contract documents;
 - Access roads, parking, grading, drainage facilities, landscaping, fencing and gates;
 - Electrical power distribution system and coordination with Florida Power and Light;
 - Standby power system including standby engine generators and fuel supply system;
 - SCADA System, Telecommunications System, and wireless data links;
 - Administration and RO Processing Building, including all building services, furnishings, and fully equipped process laboratory for on-site process control purposes;
 - Well houses for the production wells;

- Shelter for the chemical storage and feed facilities;
 - Protective building for FP&L equipment
 - Instrumentation and controls system;
 - Site and building security system, including intrusion alarm system, fire alarm system, and CCTV system;
 - Remote digital site monitoring camera system for remote viewing of site activities;
 - Staging and laydown areas, temporary field offices, and storage during construction;
 - Adequate access roads to the Production Wells for maintenance and repair purposes.
- C. The Company shall coordinate the Production Well pumping station equipment and Raw Water pipe connection with work by others.

1.02 CONSTRUCTION SEQUENCE

- A. This Section is not intended to describe the full extent of the work to be done under this Service Contract. It is intended to outline the general construction sequence only. The Company shall be responsible for scheduling of the works within the general sequence.
- B. The City Engineer will coordinate with the Company to develop and finalize the construction sequence so as to minimize impact on other contractors, subject to approval of the City.

1.03 COMPANY USE OF PROJECT SITE

- A. The identified Project Site is provided for the Company's use during construction.
- B. Make arrangements, at its sole cost and expense, with property owners if additional areas beyond the Project Site or the temporary easements identified are required. In such an event, obtain written agreements and submit copies to the Contract Administrator with copy to City Engineer for approval.
- C. Confine operations within Project Site limits, easements for construction, storage and access.
- D. Install and maintain security fencing along working and storage areas and access routes.
- E. Do not interfere with the on-going operation of the temporary and permanent facilities necessary for construction of the Production Wells and Underground Injection Wells. Coordinate with City Engineer all activities that could affect other contract work at or near the Project Site.
- F. Do not enter upon or occupy with workers, tools or materials any lands other than public streets, roadways, right-of-ways or easements shown on the Drawings except after written consent has been received from the property owner.
- G. The construction of the Project shall be carried out in such a manner that a minimum of inconvenience is caused to the owners and occupants of properties adjacent to the Project Site.

- H. Materials shall be stored separately on the Project Site at locations agreed with the City and shall be suitably protected to prevent their deterioration or the intrusion of foreign matter. In the opinion of the City, any material which has deteriorated or been damaged shall be removed immediately from the Project Site at the Company's expense.
- I. The flow in existing drains and ditches shall be maintained by the Company at all times at no extra cost to the City. During construction of the facilities, the Company shall liaise with the City Engineer to schedule work to ensure continual flow.
- J. The Company shall arrange for and bear the cost of all utilities and chemicals for the construction and commissioning of the Project.

1.04 SURFACE RESTORATION

- A. Any damage to the pavement, curbing, or sidewalks outside of the limits of excavation and excavation support or construction as defined in the Service Contract shall be the responsibility of the Company and all costs associated with the repair of the excavation, sub-base, pavement, curbing, and sidewalks shall be fully borne by the Company. Repairs shall be immediately made by the Company as per the Service Contract and as directed by the City Engineer.

1.05 COOPERATION WITH OTHER CONTRACTORS

- A. It shall be necessary for the Company to plan the Design-Build Work and cooperate with other contractors insofar as possible to prevent any interference and delay.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01040

PROJECT COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Company shall furnish personnel and equipment which is efficient, appropriate and sufficient to secure a satisfactory quality of work and a rate of progress which shall ensure the completion of the Design-Build Work within the Design-Build Period.

1.02 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means necessary to prevent accidents to persons and damage to property.

1.03 TEST PITS

A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Company. Test pits shall be backfilled immediately after their purpose has been satisfied and maintained in a manner satisfactory to the City Engineer. The costs for such test pits shall be borne by the Company.

1.04 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed Design-Build Work shall be carefully protected from damage. No movement or placing of heavy loads on constructed facilities or equipment shall be allowed, and all portions damaged shall be reconstructed by the Company at no expense to the City.

B. Should any structures become heaved, cracked or otherwise damaged, all such damaged portions of the Design-Build Work shall be completely repaired and made good by the Company at no expense to the City and to the satisfaction of the City Engineer. If, in the final inspection of the Design-Build Work, any defects, faults or omissions are found, the Company shall cause the same to be repaired or removed and replaced by proper materials and workmanship at no additional cost to the City. The Company shall be fully responsible for the satisfactory maintenance and repair of the construction and other Design-Build Work undertaken herein, as specified in Section 4.1(H) of the Service Contract.

C. The Company shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

- A. The Company shall comply with manufacturer's printed installation instructions and recommendations where more explicit or stringent than requirements contained in Design Documents.
- B. The Company shall inspect materials or equipment immediately upon delivery and again prior to installation. Damaged and defective items will be rejected by the Company
- C. The Company shall provide attachment and connection devices and methods necessary for securing work; secure work true to line and level; and allow for expansion and building movement.
- D. The Company shall install each component during weather conditions and Project status that will ensure the best possible results. Each part of the completed construction shall be isolated from incompatible material as necessary to prevent deterioration.
- E. The Company shall coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

END OF SECTION

SECTION 01050
FIELD ENGINEERING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Company shall provide and pay for field engineering services for the Design-Build Work including:
 - 1. Survey work required in execution of the Project.
 - 2. Civil, structural or other professional engineering services specified or required to execute Company's construction methods.
- B. The Company shall retain the services of a registered land surveyor licensed in the State of Florida, acceptable to the City, to identify existing control points and maintain an as-built survey during construction.

1.02 SURVEY REFERENCE POINTS

- A. Line and Grade:
 - 1. All Design-Build Work shall be constructed in accordance with the lines and grades shown on the Company drawings. The full responsibility for keeping alignment and grade shall be the responsibility of the Company.
 - 2. The City Engineer will establish bench marks and base line controlling points. Reference marks for lines and grades as the Design-Build Work progresses shall be located to cause as little inconvenience to the prosecution of the Design-Build Work as is reasonable.
- B. Surveys:
 - 1. The Company shall furnish and maintain stakes and other such materials, and give such assistance, including qualified helpers, as may be required by the City Engineer for setting reference marks.
 - 2. The Company shall check such reference marks by such means as may be deemed necessary and, before using them, shall call the City Engineer's attention to any apparent inaccuracies.
 - 3. The Company shall establish all working or construction lines and grades as required from the reference marks set by the City Engineer, and shall be solely responsible for the accuracy thereof. The Company's work shall, however, be subject to the review of the City Engineer.
 - 4. The Company shall keep the City Engineer informed a minimum of forty-eight (48) hours in advance as to the need for line and grade reference marks, in order that they may be furnished and all necessary measurements made for record with the minimum of inconvenience to the City or of delay to the Company.
 - 5. It is the intention not to delay the Design-Build Work for the establishment of reference marks but, when necessary, working operations shall be suspended for such reasonable time as the City or City Engineer may require for this purpose.
- C. Safeguarding Marks:
 - 1. The Company shall so place excavation and other materials as to cause no inconvenience in the

the use of the reference marks provided. Any obstructions placed by the Company contrary to this provision shall be removed.

2. The Company shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the Design-Build Work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying Design-Build Work improperly executed due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.
3. The Company shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the Design-Build Work and shall bear the cost of reestablishing them if disturbed or destroyed by Company's activities.
4. The Company shall notify the City Engineer immediately upon disturbing or destroying any reference marks.

1.04 RECORDS

- A. The Company shall maintain a complete, accurate log of all control and survey Design-Build Work as it progresses.

1.05 SUBMITTALS

- A. On request of the City or City Engineer, the Company shall submit documentation to verify accuracy of field engineering Design-Build Work.
- B. Prior to Final Completion, the Company shall submit three (3) certificates signed by the approved registered land surveyor certifying that elevations and locations of improvements are in conformance with Design Documents.
- C. Prior to Final Completion, the Company shall submit three (3) certified copies of a survey at the same scale as the Company's construction drawings indicating as-built elevations, alignment and stationing at 100-foot increments and at all valve and fitting locations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01070

REFERENCED STANDARDS, ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.01 REFERENCED STANDARDS

A. No provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Design Documents) shall be effective to change the duties and responsibilities of the City, Company or City Engineer, or any of their consultants, agents or employees from those set forth in the Design Documents.

In case of conflict between the referenced specifications or standards and the Design Documents, the provisions of Subsection 1.2(O) of the Service Contract shall govern.

City of Hialeah or Miami-Dade County applicable building codes and applicable Florida administrative codes and regulations relating to the design and construction of reverse osmosis water treatment plants will be followed. The referenced standards in each individual specification section shall govern those sections only. All other standards are for information/reference only.

1.02 ABBREVIATIONS

AA	-	Aluminum Association
AASHTO	-	American Association of State Highway & Transportation Officials
ABPA	-	Acoustical and Board Products Association
ACI	-	American Concrete Institute
ACOE	-	Army Corps of Engineers
AGA	-	American Gas Association
AGMA	-	American Gear Manufacturers Association
AI	-	The Asphalt Institute
AIEE	-	American Institute of Electrical Engineers (Now IEEE)
AIMA	-	Acoustical and Insulating Materials Association
AISC	-	American Institute of Steel Construction
AISI	-	American Iron and Steel Institute
ANSI	-	American National Standards Institute

API	-	American Petroleum Institute
APWA	-	American Public Works Association
ASCE	-	American Society of Civil Engineers
ASHRAE	-	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	-	American Society of Mechanical Engineers
ASSCBC	-	American Standard Safety Code for Building Construction
ASTM	-	ASTM International
AWPA	-	American Wood Preservers Association
AWPB	-	American Wood Preservers Bureau
AWS	-	American Welding Society
AWWA	-	American Water Works Association
CRSI	-	Concrete Reinforcing Steel Institute
CS	-	Commercial Standard
DOT Spec	-	Standard Specification for Road and Bridge Construction Florida Department of Transportation, 2007
EPA	-	Environmental Protection Agency
FDEP	-	Florida Department of Environmental Protection
FDOT	-	Florida Department of Transportation
FS	-	Federal Standard
GPM	-	Gallons Per Minute
HP	-	Horsepower
ID	-	Inside Diameter
IEEE	-	Institute of Electrical and Electronic Engineers
IPCEA	-	Insulated Power Cable Engineers Association
NBFU	-	National Board of Fire Underwriters

NBS	-	National Bureau of Standards
NEC	-	National Electrical Code
NECA	-	National Electrical Contractors' Association
NEMA	-	National Electrical Manufacturers Association
NFPA	-	National Fire Protection Association
NPDES	-	National Pollution Discharge Elimination System
NPT	-	National Pipe Threads
NSF	-	National Science Foundation
OD	-	Outside Diameter
OSHA	-	U.S. Department of Labor, Occupational Safety and Health Association
PCA	-	Portland Cement Association
PCI	-	Prestressed Concrete Institute
PS	-	United States Products Standards
PSIG	-	Pounds Per Square Inch Gauge
RPM	-	Revolutions Per Minute
SAE	-	Society of Automotive Engineers
SDI	-	Steel Decks Institute
SJI	-	Steel Joists Institute
SMACNA	-	Sheet Metal and Air Conditioning Contractors' National Association
SSPC	-	Structural Steel Painting Council
STA	-	Station (100 feet)
SFWMD	-	South Florida Water Management District
TDH	-	Total Dynamic Head
UL	-	Underwriter's Laboratories, Inc.

USACE	-	United States Army Corps of Engineers
USDA	-	United State Department of Agriculture
USEPA	-	United States Environmental Protection Agency

END OF SECTION

SECTION 01300

COMPANY DESIGN AND CONSTRUCTION SUBMITTALS

1.01 EXCAVATION PLAN

- A. The Contractor shall prepare and submit an excavation plan prior to beginning the Design-Build Work. The plan shall indicate the general plan for performing excavation, ground dewatering, sheeting, shoring and bracing, haul routes for the disposal of surface materials and for transporting excess excavation materials to either (1) a disposal site chosen by the Contractor when excess excavated materials are designated to become the property of the Contractor or (2) to the storage area designated by the Design Documents when the excess excavated materials are designated to remain the property of the City. The excavation plan is for the City Engineer's information only. Submission and acceptance by the City of this information shall not relieve the Contractor from constructing the Design-Build Work in a continuous safe manner at all times and in accordance with the Design Documents.

1.08 SURVEY DATA

- A. All field books, notes, and other data developed or obtained by the Contractor in performing the surveys required by the Design-Build Work shall be available to the City Engineer for examination throughout the construction period. All such data shall be submitted to the City Engineer with all other Project record documents required for Final Completion of the Design-Build Work in strict accordance with Section 01720.
- B. Survey data shall be submitted in digital electronic format as specified in Paragraph 1.03.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01352 - LEED REQUIREMENTS

1.1 SUMMARY

- A. The Design and Construction Requirements include that the Facility be designed and constructed in conformance with the Leadership in Energy and Environmental Design (LEED) Green Building Rating system in such a manner that will allow the Facility to meet LEED Silver Certification or better.

[Detailed requirements to be developed based on Technical Proposal.]

END OF SECTION 01352

SECTION 01380 – REMOTE DIGITAL SITE MONITORING CAMERA SYSTEM

REMOTE DIGITAL SITE MONITORING CAMERA SYSTEM

- A. The Remote Digital Site Video Recording system shall meet the requirements of business and government surveillance applications. The system shall offer network connectivity to other family components that shall share all video and control data over the Ethernet network. The components shall be a unique line of Digital Video Recorders and Workstations. The number of network connected components is only limited to the number of assigned IP addresses. The system shall offer multiple continuously recorded digital video channels onto a hard drive medium. In addition, the system shall share other video channels from other connected recorders and workstations. The system shall also record and playback video to and from the internal CD-RW drive. The system shall employ proprietary software run on a proprietary Microsoft® Windows® XP Embedded platform. The software shall employ an optimized MPEG4 compression algorithm in the video digitizing scheme. The networked system shall be comprised of recorders and workstations. The Remote Digital Site Video Recording system shall be Mobotix model DualNight M12 or approved equal.
1. The recorder, without any degradation to quality, shall simultaneously offer:
 - a. 16-channel continuous video recording.
 - b. 16-channel continuous video playback.
 - c. 16-channel continuous video transmission to the Ethernet network.
 - d. 16-channel continuous video receiving from the Ethernet network.
 - e. User selectable video archiving of pre-existing recording.
 2. The recorder shall provide full digital video surveillance over a standard 10/100 Base-T network by the use of a Graphical User Interface (GUI) incorporating video display areas, toolbars, control palettes, and site/device trees.
 3. The recorder shall be capable of simultaneous display, playback, distribution and archive of multiple channels of video. The recorder shall collect multiple channels of analog video and digitize them for the purpose of display, archive and requested distribution across the Ethernet network. Cameras shall be the primary analog input devices. Each channel of video data shall have the capability of being displayed, played back, distributed and archived simultaneously across several recorders and workstations across the network. The recorder shall also have full WAN and Internet capability, offering expandability beyond a corporate LAN. The recorder shall also record and playback video from its internal CD-RW drive. The recorder shall employ a compression algorithm based on:
 - a. Optimized MPEG4 and JPEG.
 4. User selectable resolution not requiring a need to restart the application or the recorder. It shall be selectable using a 4-position bar, from the Main Screen. There shall be 4 levels of resolution (Frame, Field, CIF, HCIF) with 2 levels of compression (Normal, Full) comprising 8 quality levels total, which shall be accessible from the Setup menu selections.
 5. The recorder shall have a 120 fps version. This version shall, by default, divide the total fps by the actual number of camera inputs. The actual fps rate shall have the ability to be set, by camera. The recorder shall have external RAID device connection capability to extend the total recording time beyond the limits of the specific internal hard drive.

- a. The 120 fps version shall provide a daily hard drive usage of 2 to 60 GB. This usage shall be based on Quality settings ranging from Q1 to Q8, 24 hours per day of activity ranging from Low to Very High, 50% of time movement detection and Normal compression (Hybrid MPEG4). Typical hard drive usage using normal scene activity under the same conditions shall range from 4 to 32 GB per day.
6. The networked system shall be comprised of:
 - a. The software platform.
 - b. Recorders.
 - c. Workstations.
7. The software installed in both recorders and workstations shall be similar in:
 - a. Graphical User Interface, therefore, an operator shall need to learn only one interface for both control and programming of the system.
 - b. Functions, offering the ability to remotely configure most system components from any recorder or workstation.
8. The recorder shall also offer a full multi-user authorization logon application. This application shall offer levels of authorization based on defined sites and functions. In addition, a full setup utility shall be available for the Administrator to configure authorizations. The login window shall consist of a User Name and Password field. A user shall be able to login as an Administrator or Guest. Guest authorization shall be configurable for specific system operations. The software shall offer a full multi-user authorization process as follows:
 - a. User groups shall be created once globally and shall appear in all recorders and workstations connected to the network.
 - b. Users shall be created once globally and shall be given rights to particular groups.
 - c. Groups shall be authorized and given specific access to each unit, permitting “functionspecific” profiles.
 - d. Users created and authorized for each machine shall be able to login to any recorder and workstation and automatically have their group rights for that machine follow them.
 - e. There shall be no virtual limit on the amount of Groups and Users that can be authorized in the software.
 - f. The recorder shall allow for each group to be authorized or denied access, per component, to:
 - i. Login
 - ii. Logout
 - iii. Setup:
 - a) Network Setup & Site Name
 - b) User and Group Management
 - c) Site Authorization
 - d) Auto Login
 - e) Macro Create-Edit
 - f) Alarm Setup

- g) Authentication Settings
- h) Device Setup
- i) Pre & Post Alarm
- j) Storage Database Utilities
- k) Auto Record
- l) Exit to OS
- m) RS-232 Setup
- n) Priority Setup
- o) Registration Setup
- p) Manual Record Setup
- q) Scheduler for Macros
- iv. Reports
- v. Scheduler/Macro
- vi. Shutdown/Close
 - a) Record
 - b) Stop
 - c) Change Quality
 - d) Picture
 - e) Export
 - f) Print
 - g) Controls
 - h) Live View
 - i) Playback
- 9. All users created shall be able to login to any unit on the system. A user, given appropriate access, shall be able to remotely configure all components connected to the network. The programming shall include the complete operation of the recorders, including but not limited to:
 - a. Camera titles
 - b. System reports
- 10. The recorder shall also offer a GUI capable of complete recorder configuration and operation. This capability is comprised of monitoring, recording and playback. Sub-features such as defined areas for video display and control, toolbars, site and device trees, video controls, and dialog areas shall be provided. Configuration of the system shall include setup of:
 - a. Camera names
 - b. Network parameters
 - c. Users and Groups
 - d. Data storage allocation

- e. Macro programming
- f. Scheduling and display
- g. recording
- h. Backup utility

END OF SECTION 01380

SECTION 01510
TEMPORARY UTILITIES AND CONTROLS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The City will furnish permanent 480V electrical service to the Project Site.
- B. The Company shall furnish, install and maintain temporary utilities, controls and field office utilities required for construction and shall remove said utilities and controls upon completion of the Design-Build Work.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. The Company shall:
 - 1. Comply with National Electric Code.
 - 2. Comply with all laws and regulations and with utility company requirements.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable standards and laws and regulations.

2.02 TEMPORARY POWER AND LIGHTING

- A. The Company shall arrange with utility company and City to provide service required for power and lighting, and pay all costs for service and for power used in the Company's field offices, construction, testing, startup, and trial operation prior to Final Completion.
- B. The Company shall install circuit and branch wiring, with area distribution boxes located so that power and lighting are available throughout the work areas by the use of construction type power cords.
- C. The Company shall provide temporary lighting in all work areas sufficient to maintain a lighting level during working hours conforming to the lighting level required by applicable Standards and laws and regulations.

2.03 TEMPORARY TELEPHONE SERVICE

- A. The Company shall arrange with local telephone Service Company to provide telephone service at the construction site for the use of personnel and employees. Service required includes:
 - 1. Company's Field Office.
 - 2. Other instruments at the option of the Company.
- B. The Company shall pay all costs for installation, maintenance and removal, and service charges.

2.04 TEMPORARY WATER

- A. The Company shall provide and pay for all required water for construction, testing, flushing, disinfection and consumptive purposes.
- B. The Company shall install at each and every connection to the City's or other utility's water supply, a backflow preventer meeting the requirements of ANSI A40.6, latest revision.

2.05 TEMPORARY SANITARY FACILITIES

- A. The Company shall provide toilet facilities in the field offices.
- B. The Company shall provide sanitary facilities and sanitary waste disposal in compliance with laws and regulations.
- C. The Company shall service, clean and maintain facilities and enclosures.

2.06 TEMPORARY CONTROLS

- A. Drainage and Erosion Control. The Company shall comply with requirements of Florida Department of Transportation Standard, Section 104-6.4 to achieve the following:
 - 1. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
 - 2. Protect site from puddling or running water. Provide silt barriers as required by City Engineer to protect site from soil erosion.
 - 3. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 4. Minimize amount of bare soil exposed at one time.
 - 5. Provide temporary measures such as berms, dikes, and drains, to prevent erosion.
 - 6. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
 - 7. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- B. Pollution Control
 - 1. The Company shall provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

2.07 SECURITY

- A. Full time security personnel during construction are not specifically required as a part of the Design Documents, but the Company shall provide inspection of work areas daily and shall take whatever measures as necessary to protect the safety of the public, construction personnel and materials, and to provide for the security of the site, both day and night.

PART 3 - EXECUTION

3.01 REMOVAL

- A. The Company shall completely remove temporary materials and equipment when their use is no longer required as determined by the City Engineer.
- B. The Company shall clean and repair damage caused by temporary installations or use of temporary facilities.
- C. The Company shall restore permanent facilities used for temporary services to the condition prior to use.

END OF SECTION

SECTION 01530

PROTECTION OF EXISTING FACILITIES

PART I - GENERAL

1.01 SCOPE OF WORK

- A. The Company shall protect all existing utilities, facilities, and improvements not designated for removal and restore damaged or temporarily located utilities, facilities, and improvements to a condition equal to or better than they were prior to such damage or temporary relocation in accordance with the requirements of the Design Documents.
- B. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and depth of the existing utility or facility.
- C. The Company shall determine the exact locations and depths of all existing utilities indicated on the drawings which affect the Design-Build Work. In addition to those indicated, the Company shall make exploratory excavations of all utilities. All such exploratory excavations shall be performed as soon as practicable after Construction Date and, in any event, a sufficient time in advance of construction to avoid possible delays to the Company's Design-Build Work.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION

3.01 RIGHTS-OF-WAY

- A. The Company shall not do any Design-Build Work that would affect any utility line; any fence; or any other structure, nor shall the Company enter upon the rights-of-way or easements involved with any such utilities off the Project property parcel until the Company has secured authority there for from the utility owner and provided the City Engineer with written proof of same. After authority has been obtained, the Company shall give said utility owner due Notice of the Company's intention to begin Design-Build Work, and shall give said utility owner convenient access for removing, shoring, supporting, or otherwise protecting its property and for replacing same. When two (2) or more contracts are being executed at one time on the same or adjacent land in such manner that work on one contract may interfere with that on another, the City shall decide which Company shall have priority to perform and in what manner. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the City to the Company so desiring, to the extent, amount, manner, and times permitted by the City. No such decision as to the method or time of conducting the Design-Build Work or the use of territory shall be made the basis of any claim for delay or damage, except as provided for temporary suspension of the Design-Build Work.

3.02 EXISTING UTILITIES AND IMPROVEMENTS

- A. General: The Company shall protect all utilities and other improvements which may be impaired during construction operations. It shall be the Company's responsibility to ascertain the actual location of all existing utilities and other improvements indicated on the drawings that may be encountered during construction, and to assure that such utilities or other improvements are adequately protected from damage due to such operations. The Company shall take all possible precautions for the protection of unforeseen utility lines, for uninterrupted utility service and such special protection as may be directed by the City Engineer.
- B. Utility Investigation
 - 1. Prior to commencing with trench or other excavations required for the performance of the Design-Build Work, the Company shall conduct a field investigation for the purpose of determining existing locations of all underground utilities and facilities which are shown on the drawings. The investigation shall be made by hand or machine excavation. All such excavations shall include removal of surface material and obstructions required to perform the excavations. The Company shall notify, in writing, the owner of the facility to be excavated and request that a representative of the owner be present during the excavation. The Company shall provide the utility owner adequate Notice so that a representative can be there. The Company shall provide sheeting, shoring, and bracing as required to minimize the required size of the excavation and support adjacent ground, structures, roadways, and utilities. After the data is obtained at each excavation site, the Company shall immediately backfill each excavation site. The surface shall be returned to its original grade and condition except that paved areas may be temporarily surfaced and maintained where excavations required for the performance of the Design-Build Work coincide with the location of the investigative location. The Company shall be responsible for all costs associated with the repair of roadways, paving, structures, underground and above ground utilities and facilities damaged in conducting the investigations.
 - 2. Findings of the investigation shall be reported to the City Engineer. The City Engineer will furnish one (1) set of full-size blue-line drawings for the Company's field use in recording the findings of the investigation and one (1) set of full-size sepia drawings for the Company's office use in transcribing the field investigation information onto same for submission to the City Engineer. The Company shall clearly designate all found utilities and facilities discovered whether or not shown on the drawings. The Company shall describe the size, material, and location of existing underground utilities and facilities. Locations and elevations shall be referenced to Project stationing, distance from base line, and Project bench marks. The Company shall provide written detailed description of any underground utility or facility conflicting with the elevation or alignment of the Design-Build Work.
- C. Utilities To Be Moved: If it becomes necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon proper application by the Company, be notified by the City Engineer to relocate such property within a specified reasonable time. The Company shall not interfere with said property until it has been relocated by the utility or franchise holder.
- D. City's Right of Access: The right is reserved by the City and by the owners of public utilities and franchises to enter at any time upon any public street, right-of-way, or easement for the purpose of making changes in their property made necessary by the Design-Build Work.

- E. Known Utilities: Existing utility lines that are shown on the drawings or the locations of which are made known to the Company prior to excavation that are to be retained and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired by the Company at no additional cost to the City.
- F. Unknown Utilities: If the Company damages any existing utility lines that are not shown on the drawings or the locations of which are not made known to Company prior to excavation, or were not, or could not have been verified or located by the Company prior to starting the Design-Build Work, a written report thereof shall be made immediately to the City Engineer. If directed by the City Engineer, repairs shall be made by the Company under the provisions of the Design Documents.
- G. Utilities To Be Removed: When utility lines that are to be removed are encountered within the area of operations, the Company shall notify the utility owner and the City Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruptions of the service.
- H. Approval Of Repairs: All repairs to a damaged improvement facility shall be inspected and approved by the City Engineer before being concealed by backfill or other Design-Build Work.
- I. Relocation of Utilities: Where the proper completion of the Design-Build Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is shown on the drawings, the Company shall, at Company's own expense, remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the City Engineer and the owner of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the Company in a manner that will restore or replace the utility or improvement as nearly as possible to its former location and to as good or better condition as prior to removal.
- J. Maintaining In Service: All utilities encountered along the line of the Design-Build Work shall be maintained continuously in service during all the operations, unless other arrangements satisfactory to the City Engineer are made with the Owner of said utilities. The Company shall be responsible for and shall make good all damage due to Company's operations and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

3.03 TREES WITHIN RIGHTS-OF-WAY AND PROJECT LIMITS

- A. General: The Company shall exercise all necessary precautions to prevent damage or destruction of any trees or shrubs, including those lying within access road rights-of-way and Project limits. The Company shall not trim or remove any trees unless such trees have been approved by the City Engineer or shown on the drawings for trimming or removal. All existing trees and shrubs not approved for removal, which are damaged during construction, shall be trimmed or replaced by Company under permit from the jurisdictional agencies and the City and to the satisfaction of said agencies and the City. Trees, plants and groundcover shall be accomplished in accordance with Section 02950 Trees, Plants and Ground Cover.

3.04 NOTIFICATION BY THE CONTRACTOR

- A. Prior to any excavation in the vicinity of any existing underground facilities or utilities; and all roadway and state highway rights-of-way, the Company shall notify the respective authorities

representing the owners or agencies responsible for such facilities not less than three (3) working days nor more than five (5) working days prior to excavation so that representatives of said owners or agencies can be present during such work if they so desire.

3.05 SUBSURFACE OBSTRUCTIONS

- A. The Company shall field determine, before pipeline trenching or any other excavations are begun, the depth and location of existing utilities. Utility locations indicated on the drawings are shown based on available data. The Company shall submit descriptions, depths, and locations of subsurface obstructions to the City Engineer for review if they differ from those shown on the drawings.
- B. In excavation, backfilling, and laying pipe, care shall be taken not to remove, disturb, or damage existing pipes, conduits, or structures. If necessary, the Company shall sling, shore-up, and maintain such structures in operation at no additional cost to the City.
- C. The Company shall obtain the permission of and give sufficient Notice to the proper authorities of the Company's intention to remove or disturb any pipe, conduit, structure or facility, and shall abide by their requirements and laws and regulations governing such work.
- D. In the event known subsurface structures are broken or damaged in the execution of the Design-Build Work, the Company shall immediately notify the proper authorities and, at the option of said authorities, either repair the damage at once or pay the proper charges for repairing said damage at no additional cost to the City. Repairs shall be made to the satisfaction of the City Engineer. The Company shall be responsible for any damage to persons or property caused by such breaks or due to the neglect in reporting and/or repairing such damages.
- E. Neither the City nor the City Engineer shall be liable for any claims made by the Company based on underground obstructions that could have been reasonably identified as being different than that indicated on the drawings. The Company shall uncover subsurface obstructions in advance of construction so that the method of avoiding same may be determined before the Design-Build Work reaches the obstruction.

3.06 CONFLICTS WITH OTHER UTILITIES

- A. It shall be the Company's responsibility to provide the appropriate utility company sufficient advance Notice so their representatives may verify the utility location on the Project site when construction begins. The Company shall coordinate and cooperate with these utilities to ensure that no damages occur which may cause interruption of their services.
- B. All temporary support or minor adjustment which does not require replacement or direct by-pass connections to these existing services shall be the responsibility of the Company.
- C. The City shall not be responsible for any delay or inconvenience to the Company resulting from the existence, removal, or adjustment of any public or private utility that could have been reasonably identified. Additional costs incurred as a result thereof shall be borne by the Company and considered as included in the Proposal price bid for the various pay items.
- D. Relocation or realignment of storm drains or sewer lines which may interfere with the construction of the Design-Build Work shall be the responsibility of the Company.

- E. Where storm drains or sewer lines or other utilities shown on the drawings are removed by the Company to facilitate construction and replaced in their original position, there shall be no direct payment made. All related costs shall be included in the Proposal price bid for the various pay items.

3.07 EXISTING FENCE LINES

- A. An existing fence along the perimeter boundary of the site may conflict with or impair construction operations for the installation of the Design-Build Work. The Company shall protect the fence in places where it does not conflict with construction operations. Where the fence may impede construction, the Company shall arrange for the temporary removal and relocation of the fence. Any fence temporarily relocated shall be placed in a manner to maintain the intent and integrity of the original fenced area. Any fence removed and temporarily relocated shall be restored to its original condition and location. Where it is impossible to salvage the existing materials to reconstruct the fence, the fence shall be replaced "in kind."
- B. All cost for such temporary removal, temporary replacement, or "in kind" replacement shall be included in the Proposal price bid for the various pay items. No direct payment shall be made for fence replacement.

END OF SECTION

SECTION 01540
SECURITY DURING CONSTRUCTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Company shall ensure that each employee, representative, Subcontractor, supplier, and others acting for the Company use designated access roads and parking areas.
- B. The Company shall employ watchmen on the Design-Build Work when necessary and shall erect and maintain additional such strong and suitable barriers and such lights as shall effectually prevent the happening of any accident to health or to property or to any partially completed Design-Build Work or to any materials stored on or adjacent to the site of the Design-Build Work.
- C. The Company shall employ any additional temporary fencing and gates to adequately protect the Design-Build Work, and shall provide all access required by the City Engineer and the City.
- D. Stored materials shall be kept in a neat and orderly manner. Materials that are subject to deterioration by exposure to the sun, rain or other elements shall be kept adequately covered and protected.
- E. The Company shall be responsible for protecting all stored materials and the Project Site safe from theft and vandalism. The Company shall employ security personnel and erect additional fences as necessary at no additional cost to the City.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01590

FIELD OFFICES

PART 1 - GENERAL

1.01 REQUIREMENTS

- A. The Company shall furnish, install and maintain temporary field offices for the Company's, City Engineer's and Contract Administrator's use during the entire construction period; and shall furnish, install and maintain storage and work sheds needed for construction. At completion of the Design-Build Work, the Company shall remove all field offices, sheds and contents.

1.02 SUBMITTALS

- A. Prior to the Preconstruction Conference, the Company shall submit to the County Administrator with copy to City Engineer a sketch of the temporary field offices and related facilities for consideration and approval of location, to avoid interference with the City's activities on the site.

1.03 REQUIREMENTS FOR CONTRACTOR AND CITY ENGINEER FACILITIES

- A. Construction shall:
 - 1. Be structurally sound, weathertight, with floors raised above ground.
 - 2. Have steps and platforms with handrails to permit entry to the offices. This work shall conform to the South Florida Building Code and OSHA requirements.
 - 3. Shall be blocked up and hurricane straps installed conforming to the applicable building codes.
 - 4. Have temperature transmission resistance: Compatible with occupancy and storage requirements.
 - 5. At Company's option, portable or mobile buildings may be used.
 - a. Mobile trailers or buildings, when used, shall be modified for office use.
 - b. Mobile trailers or buildings shall not be used for living quarters.
- B. The Company shall make all provisions and pay all installations and other costs including maintenance and supplies, telephone service and power service for all field offices.

1.04 COMPANY'S OFFICE AND FACILITIES

- A. Company's office and facilities shall have the following:
 - 1. Size: As required for general use.
 - 2. Lighting: 50-foot-candles at desk top height.
 - 3. Automatic heating and mechanical cooling (air conditioning) equipment sufficient to maintain comfort conditions.
 - 4. Telephone: One direct line instrument.
 - 5. Racks and files for Project Record Documents.
 - 6. Other furnishings: Company's option.

7. One 10-inch outdoor-type thermometer.
8. Xerographic machine with reduction and enlargement capabilities.
9. Facsimile machine (plain paper model).

1.05 CITY ENGINEER'S AND CONTRACT ADMINISTRATOR'S OFFICE

- A. The City Engineer's and Contract Administrator's field office, equipped as specified herein, shall be provided at the site indicated ready for use by the City Engineer and the Contract Administrator prior to commencement of construction activities.
- B. The Company shall furnish a field office for the exclusive use of the City Engineer and the Contract Administrator. The field office shall be clean and in good condition, as evaluated by the City Engineer and the Contract Administrator, and consist of a nominal 42-foot by 20-foot double wide (or equivalent) trailer with four offices, conference room with minimum 12 person seating capacity, unisex washroom and small kitchen area. Floor plan is subject to acceptance by City Engineer and the Contract Administrator.
- C. The structure shall be watertight with suitable windows and doors with substantial locks. All windows shall have venetian blinds and aluminum screens. Adequate lighting shall be furnished with wall switches provided for all ceiling lighting fixtures, which shall either be installed flush or recessed into the ceiling.
- D. The trailer shall conform to HUD requirements. Minimum ceiling height shall be 7-feet 6-inch. The interior shall have vinyl tile floor covering, wall paneling, 100 amp electrical service, copper wiring, 20 gallon electric water heater, copper water piping, a six cubic foot refrigerator, 600 watt microwave oven and two wall mounted fire extinguishers. The refrigerator and microwave oven must be clean and of working order to the satisfaction of the City Engineer and the Contract Administrator. Washroom shall be equipped with a flush toilet connected to a holding tank, cabinet mounted washbasin and medicine cabinet complete with supplies. Plumbing fixtures shall be acceptable house type, trapped and vented.
- E. Air conditioning shall be provided which is capable of lowering the temperature to 72 degrees in hot weather. Heating shall be provided which is capable of raising the temperature to 78 degrees in cold weather.
- F. The Company shall install the City Engineer's and the Contract Administrator's field office trailer and provide services as follows and as identified on the Drawings:
 1. The Company shall provide outside lighting on the trailer.
 2. All necessary sanitary, water and telephone service connections shall be provided to the trailer. Provide multi-line phone service and multi-line speaker phones for each office and the conference room. Each phone will have 4 lines available. The trailer shall be equipped with phone switchgear. Phone system shall have voice mail feature. Provide one facsimile machine. Cabling and installation is required.
 3. The Company shall provide and pay all costs for telephone service, including local and long distance charges, power, and weekly janitor service. The Company shall provide in its proposal a \$600 per month allowance for the City Engineer's and the Contract Administrator's telephone service. Telephone records shall be maintained throughout the construction phase.
 4. Provide Internet service to trailer, minimum 10 megabits per second.

5. The Company shall furnish and replace electric bulbs and/or fluorescent tubes, toilet paper, towels and soap and maintain the office scanner/copiers, facsimile and other equipment in first-class condition, including all papers, ink cartridges, and repairs until Final Completion.
 6. The Company shall provide fire insurance, extended coverage and vandalism, malicious mischief and burglary and theft insurance coverage for the City Engineer's and the Contract Administrator's field office trailer in the amount of \$100,000 and for field office equipment in the amount of \$50,000.
 7. Bottled drinking water shall be furnished with electric water cooler to dispense hot and cold water.
 8. The Company shall provide and pay for costs of cleaning services for the trailer once per week or to the satisfaction of the City Engineer and the Contract Administrator.
- G. The Company shall furnish new or like new office furniture for the City Engineer's and the Contract Administrator's field office. Office furniture and equipment shall consist of the following:
1. Four double pedestal desks.
 2. Four conventional office chairs.
 3. Four four-drawer legal size (52 inches high) filing cabinets.
 4. One 72-inch high storage cabinet with four adjustable shelves 36W x 24D.
 5. Eight 30-inch x 60-inch reference tables.
 6. Four bookcases - 60 inches high x 36 inches wide x 11 inches deep with four shelves.
 7. Four desk lamps with two 15-watt tubes.
 8. Sixteen conventional office chairs.
 9. One dry erase "white board" 4 feet x 6 feet wall mount type, with aluminum frame, full length marker rail, two erasers and two boxes of four color dry erase markers.
 10. Seven wastepaper baskets.
 11. One aluminum framed cork faced bulletin board 36-inch x 60-inch wall mount type.
 12. One Multifunction scanner/copier, or equivalent complete with automatic document feeder, stand, service contract for duration of project, consumables and other necessary accessories, or equal.
 13. One plain paper facsimile, or equivalent with service contract for duration of project, consumables and other necessary accessories, or equal.

1.06 ACCESS ROADS AND PARKING

A. Access Roads

1. The Company shall construct and maintain temporary roads to serve construction area. The Company shall maintain all temporary roads in an acceptable condition.

B. Parking

1. The Company shall provide temporary parking areas to accommodate construction personnel.
2. The Company shall not allow vehicle parking on existing pavement or within existing public rights-of-way.

1.07 USE OF PERMANENT FACILITIES

- A. Permanent facilities or City's temporary facilities shall not be used for field offices or for storage.

PART 2 - PRODUCTS

2.01 MATERIALS, EQUIPMENT, FURNISHINGS

- A. Materials, equipment and furnishings may be new or used, but must be serviceable, adequate for required purpose, and must comply with all applicable laws and regulations.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The Company shall fill and grade sites for temporary structures to provide adequate surface drainage.

3.02 INSTALLATION

- A. The Company shall construct temporary field offices on proper foundations; provide connections for utility services; secure portable or mobile buildings when used; provide steps and landings at entrance doors; and provide hurricane or high wind tie downs, all in accordance with all applicable laws and regulations.
- B. The Company shall mount thermometer at convenient outside location, not in direct sunlight.

3.03 MAINTENANCE AND CLEANING

- A. The Company shall provide periodic maintenance and cleaning for temporary structures, furnishings, equipment and services at not less than two (2) week intervals.

3.04 REMOVAL

- A. The Company shall remove temporary field offices and storage structures, contents and services at a time when no longer needed and as approved by the City Engineer.
- B. The Company shall remove foundations and debris and grade the site to required elevations and clean the areas.

END OF SECTION

SECTION 01600
MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Products.
- B. Preparation for Shipment.
- C. Packaging and delivery of spare parts and special tools.
- D. Shipment and handling.
- E. Inspection.
- F. Storage and protection.
- G. Inventory control.
- H. Product options.
- I. Products list.
- J. Substitutions.
- K. Systems demonstration.

1.02 PRODUCTS, MATERIALS AND EQUIPMENT

- A. **DEFINITIONS:** The word, "Products," as used herein, is defined to include purchased items for incorporation into the Design-Build Work, regardless of whether specifically purchased for project or taken from Company's stock of previously purchased products. The word, "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of Design-Build Work. The word, "Equipment," is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, etc.). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Design Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms which are self-explanatory and have recognized meanings in the construction industry.
- B. Products to be provided by the Company shall be standard catalog products of manufacturers regularly engaged in the manufacture of the products.

- C. Products shall meet the requirements of the Design Documents and shall be suitable for the installation. Where two or more units of the same equipment class are furnished, the equipment shall be from the same manufacturer and shall be interchangeable.
- D. Products shall be installed in accordance with the requirements of the Design Documents and approved recommendations of the manufacturers.

1.03 QUALITY ASSURANCE

- A. Source Limitations. To the greatest extent possible for each unit of Design-Build Work, Company shall provide products, materials, or equipment of a singular generic kind from a single source, unless otherwise specified.
- B. Compatibility of Options. Where more than one choice is available as options for Company's selection of a product or material, Company shall select an option which is compatible with other products and materials already selected (which may have been from among options for those other products and materials). Total compatibility among options is not assured by limitations within the Design Documents, but must be provided by the Company. Compatibility is a basic general requirement of product/material selection.

1.04 PRODUCTS LIST SUBMITTAL

- A. Within 30 days after the Construction Date, the Company shall submit a complete list of products proposed for use, including those listed in the Proposal, with name of manufacturer, trade name, model number of each product, and manufacturer's written instruction on delivery, handling and storage.

1.05 PREPARATION FOR SHIPMENT

- A. When practical, equipment shall be factory assembled. The equipment parts and assemblies that are shipped unassembled shall be furnished with an assembly plan and instructions. The separate parts and assemblies shall be match-marked or tagged in a manner to facilitate field assembly.
- B. Generally, machined and unpainted parts subject to damage by the elements shall be protected with an application of a strippable protective coating.
- C. Equipment shall be packaged or crated in a manner that will provide protection from damage during shipping, handling, and storage.
- D. The outside of the package or crate shall be adequately marked or tagged to indicate its contents by name and equipment number, if applicable; approximate weight; any special precautions for handling; and the recommended requirements for storage prior to installation.

1.06 PACKAGING AND DELIVERY OF SPARE PARTS AND SPECIAL TOOLS

- A. Spare parts and special tools shall be properly marked to identify the associated equipment by name, equipment, and part number. Parts shall be packaged in a manner for protection against damage from the elements during shipping, handling, and storage. Spare parts and special tools shall be shipped in boxes that shall be marked to indicate the contents. Delivery of spare parts and special tools shall be made prior to the time the associated equipment is scheduled for the initial test run.

1.07 SHIPMENT AND HANDLING

- A. Shipments shall be addressed to the Company who shall be responsible for their receipt, unloading, handling, and storage at the site. The City or City Engineer will not accept deliveries on behalf of the Company or his subcontractors or assume responsibility for security of materials, equipment, or supplies delivered to the site.
- B. Products shall be transported and handled in accordance with manufacturer's instructions.
- C. The Company shall promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- D. The Company shall provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.08 INSPECTION

- A. Immediately upon receipt of equipment and materials at the job site, the Company shall inspect for completeness and any evidence of damage during shipment. Should there appear to be any damage, the City Engineer shall be immediately notified, and the Company shall be responsible for informing the manufacturers and the transportation company of the extent of damage. If the item or items require replacing, the Company shall take the necessary measures to expedite the replacement.

1.09 STORAGE AND PROTECTION

- A. Products shall be stored in accordance with manufacturer's written instructions, with seals and labels intact and legible. Sensitive products shall be stored in weather-tight enclosures; temperature and humidity ranges shall be maintained within required limits by manufacturer's written instructions.
- B. For exterior storage of fabricated products, place on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering; provide ventilation to avoid condensation.
- C. Loose granular materials shall be stored on solid surfaces in a well-drained area; prevent mixing with foreign matter.
- D. Storage shall be arranged to provide access for inspection. Company shall periodically inspect to assure products are undamaged, and are maintained under required conditions.
- E. The City will not approve payment for any improperly stored materials.

1.10 INVENTORY CONTROL

- A. Equipment and materials shall be stored in a manner to provide easy access for inspection and inventory control. The Company shall keep a running account of all materials in storage to facilitate inspection and to estimate progress payments for materials delivered but not installed in the Design-Build Work.

1.11 SYSTEMS DEMONSTRATION

- A. Prior to final inspection, the Company shall demonstrate operation of each system to City Engineer and City.
- B. The Company shall instruct City's personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01700
CONTRACT CLOSE-OUT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Company shall comply with requirements stated in the Service Contract for administrative procedures in closing out the Design-Build Work.
- B. Substantial Completion shall be in accordance with the Service Contract.

1.03 FINAL INSPECTION

- A. Final inspection and Final Completion of the Design-Build Work shall be in accordance with the Service Contract.

1.04 CONTRACTOR'S CLOSE-OUT SUBMITTALS TO CITY ENGINEER

- A. The Company shall submit the following documents to the County Administrator with copy to City Engineer prior to request for final payment:
 - 1. Evidence of compliance with requirements of governing authorities, all Project permits and all applicable laws and regulations.
 - 2. Project record documents and submittals in electronic digital format in accordance with Appendix 5 of the Service Contract.
 - 3. Operating and maintenance data in accordance with the Service Contract.
 - 4. Spare parts and maintenance materials in accordance with the Service Contract.
 - 5. Evidence of payment and release of liens in accordance with the Service Contract.
 - 6. Evidence of completion of all required supplier training, testing and, where required, start-up.
 - 7. Prior to Final Completion, the Company shall submit a certificate from the supplier or manufacturer, as applicable, stating that the installation of the applicable portion of the Design-Build Work is satisfactory, that the equipment has been satisfactorily tested and is ready for operation.
- B. Final Payment shall be in accordance with the Service Contract.

1.06 CLOSE-OUT

- A. The Company shall meet with the City and the City Engineer to resolve all outstanding issues including but not limited to:
 - 1. Claims and adjustments for Design-Build Period or Design-Build Price.
 - 2. Outstanding unused allowances.
 - 3. Procedures for handling warranty issues.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS

- A. The Company shall maintain at the site one (1) record copy of:
 - 1. Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Design and Construction Requirement Changes
 - 5. Change Orders
 - 6. Approved shop drawings, product data and samples
 - 8. Field test records
 - 9. Construction photographs
 - 10. Record Drawings
 - 11. Submittal log
 - 12. Operating and Maintenance data
 - 13. Site Conditions Survey Data
 - 14. Field Engineering Survey Data

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. The Company shall maintain documents in a clean, dry, legible condition and in good order. Record documents shall not be used for construction purposes.
- B. The Company shall make documents and samples available at all times for inspection by the City and the City Engineer.
- C. As a prerequisite for partial payments, the Company shall exhibit the currently updated Record Drawings and other Record Documents for review by the City and the City Engineer.

1.03 RECORDING

- A. The Company shall label each document "PROJECT RECORD" in neat large printed letters applied using an approved stamp.
- B. The Company shall record information concurrently with construction progress.

- C. Record Drawings shall be legibly marked to record actual Design-Build Work including:
 - 1. Site elevations and all underground piping survey data.
 - 2. Field changes of dimensions and details.
 - 3. Changes made by Change Order.
 - 4. Details not on drawings.
- D. Specifications and addenda shall be legibly marked to record:
 - 1. Supplier (manufacturer), trade name and catalog number of each product and item of each product and item of equipment actually installed.
 - 2. Changes made by Design and Construction Requirements Change or by Change Order.

1.04 SUBMITTAL

- A. Prior to Final Completion, the Company shall deliver signed and sealed Project Record Documents, as required, to the City Engineer and applicable regulatory agencies.
- B. The Company shall accompany the submittal with a transmittal letter in duplicate, containing:
 - 1. Date
 - 2. Project name and number
 - 3. Company's name and address
 - 4. Title and number of each Project Record Document
 - 5. Signature of Company or Company's authorized representative.
- C. The Company shall also submit applicable final Record Documents, after the review and approval by the County Administrator with copy to City Engineer and the City, in electronic format as specified in Appendix 5 of the Service Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01740

WARRANTIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Company shall compile specified warranties, as required by the Service Contract and as specified in these specifications.
2. The Company shall review submittals to verify compliance with Design Documents.
3. The Company shall submit required submittals to the County Administrator with copy to City Engineer for review.

1.02 SUBMITTAL REQUIREMENTS

- A. The Company shall assemble in one document all warranties, service and maintenance contracts, executed by each of the respective suppliers (manufacturers), and subcontractors. Each warranty shall be executed in the name of and to the benefit of the City, or assigned to the benefit of the City by the Company and the supplier.
- B. Five (5) original signed copies of each warranty and contract are required.
- C. A Table of Contents shall be provided and shall be neatly typed, in orderly sequence and shall provide complete information for each item including, at a minimum:
 1. Product of work item.
 2. Firm, with name of responsible principal, address and telephone number.
 3. Scope of work item.
 4. Date of beginning of warranty, bond or service and maintenance contract.
 5. Duration of warranty or service maintenance contract.
 6. Other information for City's personnel including instances which might affect the validity of warranty.
 7. Company, name of responsible principal, address and telephone number.
- D. Two (2) copies of the document shall be submitted to the County Administrator with copy to City Engineer.

1.03 FORM OF SUBMITTALS

A. Format:

1. Page size: 8-1/2 inches x 11 inches
 - a. Sheets shall be punched for use in a standard three O-ring binder.
 - b. Larger sheets shall be folded to 8-1/2 inches x 11 inches.
2. Cover: Each packet cover shall identify with typed or printed title "WARRANTIES" and the following information:

- a. Project name and number
 - b. Name of Company
- B. Binder: Commercial quality, three O-ring binder, with durable and cleanable plastic covers and maximum ring size of two inches shall be used.
- C. The Company shall also submit the warranties, after the review and approval by the City and the County Administrator with copy to City Engineer, in electronic format as specified in Appendix 5 of the Service Contract.

1.04 WARRANTY REQUIREMENTS

- A. Warranty requirements shall be in accordance with Service Contract, Article IV, Section 4.19.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 02200
EARTHWORK AND SITE PREPARATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The extent of earthwork, site preparation, and incidental appurtenant work shall be as shown on the drawings and as specified herein.

1.02 SITE INVESTIGATION

- A. Soil Investigation Report. Soil investigation reports have been prepared by GEOSOL, Inc. See Attachment 2A-1 of Appendix 2. These reports may be used as information pertaining to subsurface conditions on this project, subject to the conditions stated in the Design Documents. Summaries of borings and related information depict subsurface conditions only at the specific locations and at the particular time designated on the logs. Soil conditions at other locations may differ from conditions occurring at the boring locations.
- B. Company's responsibility. The Company shall examine the site and make inspections in order to determine the full extent of the Design-Build Work required to conform to the drawings and specifications. The Company shall satisfy himself as to the nature and location of the Design-Build Work, subsurface conditions, the conformation and condition of the existing ground surface, and the character of equipment and facilities needed prior to and during prosecution of the Design-Build Work. The Company shall also satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered.

1.03 SUBMITTALS

- A. The Company shall submit submittals County Administrator with copy to City Engineer as specified in Appendix 5 of the Service Agreement.
- B. The Company shall submit for record purposes only, and not for review, shop drawings showing the location and layout of proposed sheeting, shoring, and bracing.
- C. The Company shall submit an excavation plan as described in Paragraph 1.08 B.
- D. Submit complete design calculations prepared, signed and sealed by a qualified structural engineer registered in the state of Florida for proposed sheeting systems. These calculations shall address the size of sheeting, wales, rakes, soldier piles, lagging, anchorage systems, struts, earth anchors, anchor piles, tie rods, and other components pertinent to the design. Submit prior to the start of Design-Build Work involving sheeting and bracing.
- E. Submit material certificates signed by the material producer and the Company, certifying that each material item complies with specified requirements.

1.04 SAFETY

- A. The Company shall conform to the regulations of the OSHA General Industry Occupational Safety and Health Standards and OSHA Safety and Health Regulations for Construction, and all applicable State and municipal agencies. Company shall provide and maintain warning barricades, flags, torches, and other safety devices as required by local, State, and Federal codes and shall conduct Design-Build Work so as to create a minimum disruption to traffic and other contractors, and the public. Temporary suspension of Design-Build Work does not relieve the Company of responsibility for the above requirements.

1.05 ENVIRONMENTAL SAFEGUARDS AND REGULATIONS

- A. The Company shall comply with local, State, and Federal regulations in force at all times to prevent pollution of air and water.

1.06 QUALITY ASSURANCE

- A. The Company shall procure, store, and place materials from either on site or off-site sources which comply with the specified requirements. All materials proposed for incorporation into the Design-Build Work shall be analyzed prior to their use for compliance to these specifications. The Company shall notify the City Engineer 48 hours in advance that the work is ready for testing and inspection.
- B. Applicable tests:
 - 1. Controlled Fills:
 - a. Classification - ASTM D2487.
 - b. Physical Properties - ASTM D854, D2216.
 - c. Compaction - Modified Proctor ASTM D1557, AASHTO T-180 (Modified Heavy Proctor).
 - d. FDOT - Section 911.
 - 2. Structural Fill:
 - a. Classification - ASTM D2487.
 - b. Atterberg Limits - ASTM D4318 - Liquid limit, Plastic Limit, and Plasticity Index of Soils.
 - c. Compaction - Modified Proctor ASTM D1557.
 - d. Physical Properties - ASTM D854, D2216.
 - 3. Backfill or Fill:
 - a. Classification - ASTM D2487.
 - b. Physical Properties - ASTM D854, D2216.
 - c. Compaction - Modified Proctor ASTM D1557.
 - 4. Trench Backfill:
 - a. Classification - ASTM D2487.
 - b. Compaction - Modified Proctor ASTM D1557.

1.07 GRADING TOLERANCES

- A. A minimum grade separation of 2 feet between seasonal high groundwater levels and final slab elevations shall be maintained. Seasonal high groundwater levels are in soils reports referenced in Paragraph 1.02A. The site may need to be raised a minimum of 2 feet in some locations to ensure the grade slab elevations will remain above the seasonal high groundwater level.
- B. Grades shall be as constructed as approved in the FDEP Environmental Resource Permit (ERP). Company shall follow all FDEP procedures to request any changes to, and modifications of, the ERP.

1.08 EXCAVATIONS

- A. Excavations greater than 5 feet deep shall be sheeted and shored in conformance with OSHA requirements, or, where space is available and where permitted by the City Engineer may be laid back at slopes conforming to OSHA requirements. Provide drawings and calculations for the design of the sheeting and shoring as specified herein.

1.09 COMPACTION

- A. The maximum dry density and optimum moisture content of each soil type used in the various fills shall be determined in accordance with ASTM D1557. Company shall provide moisture density curves for each soil type to be compacted. Field density tests shall be determined in accordance with ASTM D1556, ASTM D2167, and ASTM D2922.

1.10 SPOIL

- A. On site material deemed unsuitable by the City Engineer, either from tests or visual inspection, for use as fill or backfill shall be removed from the site. Construction debris and other debris contained within this material shall be removed and disposed of as described in paragraph 1.11 below.

1.11 CLEAN-UP

- A. The Company shall remove rubbish, debris, junk, temporary materials, and waste excavated materials from the site. Such materials shall be disposed of in accordance with applicable laws, regulations, and permits and the Company shall have approval from the owner of the property upon which the material will be disposed. The Company shall restore staging and storage areas and temporary roads to original condition to the satisfaction of the City Engineer as a condition for final acceptance and payment.

1.12 SILT BARRIERS

- A. The Company shall provide silt barriers or hay bales to prevent siltation of waterways and drainage courses.

1.13 EXCESS EXCAVATED MATERIALS

- A. All excess excavated materials shall become the property of the Company and shall be disposed of by the Company off the Project site.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Controlled Fill. Materials for controlled fill shall consist of any acceptable material imported or excavated from the cut areas.
- B. Structural Fill. Materials shall be an open graded crusher run limerock, 2-inch maximum size, coarse aggregate. The minimum thickness under slabs shall be 12 inches.
- C. Backfill or Fill. Material classified as SM, SC, or better in accordance with ASTM D2487, free of rock or gravel larger than 6 inches in any dimension, except that for A-2 material, the plastic limit shall not exceed 30 and the plasticity index shall be less than 8. Material with particles larger than 2 inches shall not be used within 2 feet of structures. Debris, waste, organic material, and other deleterious matter shall not be used.
- D. Pipe Bedding Material.
 - 1. Crushed stone conforming to FDOT size 7 or 78 as described in Florida Department of Transportation Standard Specifications for Road and Bridge Construction Section 901, Table 1.
 - 2. Sand shall consist of soil classified as SP, SW, or SM by the Unified Soil Classification System (USCS) and shall have a plasticity index when tested of less than 7 and shall have a liquid limit of 25 or less. Sand shall have no more than 10 percent passing the no. 200 sieve. The material shall be free from roots, organic material, trash, rock, clay lumps, or other deleterious or objectionable material.
- E. Pavement Base and Surface Courses.
 - 1. Materials for base course shall be structural fill as specified in this Division, paragraph 2.01B, except geotextile fabric shall not be required.
 - 2. Materials for surface course shall be crushed concrete conforming to FDOT Specification Section 901 Coarse Aggregate.
- F. Geotextile Fabric.
 - 1. Geotextile fabric placed under structural fill and rip rap shall meet all requirements of FDOT Standard, Section 985 Class (2) for stabilization and reinforcement.
- G. Erosion Control Materials.
 - 1. Silt fence and staked silt barriers shall meet all requirements of FDOT Standard, Section 985 Class (4) for erosion control.
 - 2. Hay bales shall meet all requirements of FDOT Standard, Section 981-3.1 dry mulch.
- H. Rip Rap. Rip Rap shall meet requirements of FDOT Standard, Section 530. Pieces shall measure approximately four to eight inches in any direction.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Design-Build Work shall be constructed to the lines, grades, elevations, slopes, and cross sections indicated on the drawings, and specified herein. Slopes, graded surfaces, and drainage features shall present a neat, uniform appearance upon completion of the Design-Build Work.
- B. It shall be the Company's responsibility to maintain adequate safety measures and working conditions, and to take measures necessary during the performance of the Design-Build Work to protect the entire Project area and adjacent properties which would be affected by this Design-Build Work from storm damage, flood hazard, caving of trenches and embankments, and sloughing of material, until final acceptance by the City. It shall be the Company's responsibility to maintain completed areas until the entire Project area is in compliance with the specifications.
- C. Erosion control measures shall be accomplished in accordance with Section 01510.
- D. Utility lines and structures which are to remain in service shall be protected from damage as a result of Company's operations. Where utility lines, underground pipes and conduits, or structures not shown on the drawings are encountered, the Company shall report them to the City Engineer before proceeding with the Design-Build Work. The Company shall bear the cost of repair or replacement of utility lines or structures which are broken or damaged by his operations.
- E. No fill shall be placed on spongy, porous, or wet subgrade.
- F. No fill or Design-Build Work shall be placed on subgrades prior to testing or City Engineer approval.

3.02 CLEARING AND GRUBBING

- A. Clearing. Clearing consists of the complete removal of objectionable materials and obstructions above and below the ground surface including tree stumps, brush, grass, vegetative matter, and other objectionable materials within the Design-Build Work limits. Brush and organic material shall be removed before placing any fills. It shall be the Company's responsibility to save and protect trees that lie outside the Design-Build Work area. No trees shall be removed unless approved by the City Engineer.
- B. Grubbing. Grubbing consists of the complete removal of stumps, including tap roots or lateral roots 1-1/2 inches or more in diameter, and the removal of brush, grass, or weeds to depths below the natural ground as specified herein. Stumps shall be grubbed to a depth of 3 feet, and grass or weeds shall be grubbed to a depth of 12 inches below the natural ground surface.
- C. Protection. Existing items not designated to be cleared and grubbed or removed shall be protected from damage. Such items damaged shall be restored or replaced immediately at the Company's expense.
- D. Debris and Waste Material. Debris and waste material resulting from clearing and grubbing shall be removed from the site and disposed of as specified herein.

3.03 DUST CONTROL

- A. The Company shall take steps to prevent and reduce dust arising from the construction activity. He shall have adequate self propelled water trucks to water, as necessary, the areas where dust may arise. Roadways and bare earth areas shall be kept moist at all times to eliminate dust from wind or traffic. When directed by the City Engineer, the Company shall within one hour sprinkle the areas creating the wind or traffic dust. The Company may, with approval of the City Engineer apply calcium chloride for dust control with subsequent applications as directed by the City Engineer.

3.04 CARE OF DRAINAGE WATER

- A. Company shall remove drainage water from the construction operations, and storm water reaching the construction area, so that no damage will result to the excavation, pipe, or structures. The Company shall be responsible for any damages to persons or property on or off the construction site due to such drainage water or to the interruption or diversion of such storm water on account of his operations.
- B. Grading shall be done as necessary to prevent surface water from flowing into excavations. Water accumulating therein shall be removed by pumping or by other approved methods.

3.05 EXCAVATION

- A. General. Excavate material of whatever nature encountered to the lines and grades required for the Design-Build Work.
 - 1. Excavation includes removal and disposal of earth materials, pavements and other obstructions, the ground surface, underground structures and utilities indicated to be removed and any other structures and materials encountered whether indicated or not.
 - 2. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions. Unauthorized excavation, as well as remedial work, shall be at the Company's expense.
 - a. Under footings or foundation bases, fill unauthorized excavation by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering required top elevation as approved by the City Engineer.
 - b. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations unless otherwise directed by the City Engineer.
- B. Additional Excavation. When excavation has reached required subgrade elevations, the City Engineer shall make an inspection of conditions.
 - 1. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material with structural fill. Unsuitable material shall include organic soil, soft or loose bearing material, saturated soil, vegetation, cinders, debris, trash, and other material of inadequate bearing.
 - 2. Removal of unsuitable material below required subgrade elevations and its replacement will be paid on the basis of Service Contract Article IV, Section 4.10.
- C. Stability of Excavations. Slope sides of excavations to comply with codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion

completion of backfilling.

- D. Safety Requirements. Provide and maintain warning barricades, flags, torches, and other safety devices as required by local, State, and Federal codes and conduct Design-Build Work to create minimum inconvenience to the public. Temporary suspension of Design-Build Work does not relieve responsibility for the above requirements.
- E. Sheet piling, Shoring, and Bracing. Provide materials for sheet piling, shoring, and bracing, such as sheet piling, uprights, stringers and crossbraces, in good serviceable condition.
 - 1. Establish requirements for trench shoring and bracing to comply with codes and authorities having jurisdiction.
 - 2. Maintain shoring and bracing in excavations. Carry down shoring and bracing as excavation progresses.
- F. Dewatering. Company shall familiarize himself and fully comply with the applicable rules, regulations and permit requirements of the Florida Department of Environmental Protection and the South Florida Water Management District and shall obtain all required permits for dewatering. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
 - 1. Do not allow water to accumulate in excavations or at subgrade level. Remove water to prevent softening of foundation bottoms and soil changes detrimental to stability of subgrades and foundations. Provide and maintain dewatering system components necessary to convey water from excavations.
 - 2. Convey water removed from excavations and rain water to collecting or runoff areas away from buildings and other structures. Establish and maintain temporary drainage ditches and other diversions outside excavation limits. Do not use trench excavations as temporary drainage ditches.
 - 3. Dewatering devices shall be provided with filters to prevent the removal of fines from the soil. Should the pumping system draw fines from the soil, the City Engineer shall order immediate shutdown, and remedial measures will be the responsibility of the Company.
 - 4. Upon completion of the dewatering work, the Company shall remove all equipment and leave the construction area in a neat, clean and acceptable condition.
 - 5. Maintain ground water table at least 12 inches below the bottom of any excavation. At lower levels dewatering shall be as required to prevent softening of foundation bottoms and soil changes detrimental to the stability of subgrades.
- G. Dewatering Performances. Performance of the dewatering system for lowering ground water shall be measured by observation wells or piezometers installed in conjunction with the dewatering system, and these shall be read at least daily. The Company shall maintain a log of these readings and submit them to the City Engineer.
- H. Material Storage. Stockpile excavated materials. Place, grade, and shape stockpiles for proper drainage.
 - 1. Locate and retain soil materials away from edge of excavations.
 - 2. Dispose of excess soil material and waste materials, as specified herein.

I. Excavation for Structures.

1. Conform to elevations and dimensions shown on the drawings within a tolerance of plus or minus 0.10 foot and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and inspection.
2. In excavating for footings and foundations, take care not to disturb bottom of excavation. Trim bottoms to required lines and grades to leave solid base to receive structural fill or concrete. The bottom of excavation shall be inspected by the City Engineer to ensure adequate bearing for the structure. No concrete or other work shall be placed until City Engineer's approval has been obtained.

3.06 PREPARATION

- A. Generally, compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with controlled fill and compact to density equal to or greater than requirements for subsequent backfill material.

3.07 BACKFILLING (ALL CLASSES)

- A. Backfill areas to contours and elevations as shown on the drawings.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.
- C. Place geotextile fabric on subgrades to receive Structural Fill and rip rap, except for roadway base courses.
- D. Structural Fill: Place and compact materials in continuous layers not exceeding 8 inches compacted depth. Compaction shall be at a moisture content near the optimum moisture content and to a density not less than 95 percent of the maximum density at optimum moisture.
- E. Controlled Fill: Place and compact materials in continuous layers not exceeding 6 inches compacted depth. Compaction shall be at a moisture content near the optimum moisture content and to a density not less than 95 percent of the maximum density at optimum moisture.
- F. Backfill or Fill: Place and compact material in continuous layers not to exceed 8 inches compacted depth. Compaction shall be at a moisture content near the optimum moisture content and to a density not less than 95 percent of the maximum density at optimum moisture.
- G. Employ a placement method that does not disturb or damage foundation, perimeter, drainage, foundation dampproofing, foundation waterproofing, protective cover and utilities in trenches.
- H. If backfilling against unsupported walls is necessary, backfill simultaneously on each side of wall until supports are in place.
- I. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise.
- J. Make grade changes gradually. Blend slopes into level areas.

3.08 RIP RAP

- A. Rip rap shall be hand placed, fitting smaller pieces between the interstices of the larger pieces. Geotextile fabric shall be placed under the rip rap and the minimum thickness of the completed rip rap shall be 12 inches.

3.09 ROADWAY/PARKING AREA SUBGRADE

- A. Compact subgrade to 95 percent of maximum density per ASTM D1557 test method.

3.10 BASE AND SURFACE COURSES

- A. Base course shall be constructed at the start of construction and used as the access road during construction. The base course shall be graded and maintained during construction, adding crushed limerock as required to maintain an access road suitable for all motor vehicles.
- C. Not more than 14 days prior to Final Completion, the base course shall be graded and shaped and the surface course constructed as shown on the drawing.

3.11 TESTING

- A. The City will provide the following testing for roadways and parking areas as set forth in the FDOT Standards:
 - 1. Subgrade compaction tests, four for each 500 square yards of subgrade.
 - 2. Four compaction tests for each 500 square yards of base course.

3.12 CLEAN-UP

- A. Upon completion of the Design-Build Work, rubbish and debris shall be removed from the job site. Construction equipment and implements of service shall be removed, and the entire area involved shall be left in a clean and acceptable condition.

END OF SECTION

SECTION 02221

TRENCHING, BACKFILLING, AND COMPACTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Design-Build Work of this Section includes trench excavation and backfill.

1.02 SUBMITTALS

- A. All submittals shall be submitted to the County Administrator with copy to City Engineer in accordance with Appendix 5 of the Service Contract.

1.03 GENERAL REQUIREMENTS

- A. Requirements of Section 02200 apply to this Section.
- B. The Design-Build Work performed under this specification shall be constructed to the lines, grades, elevations, slopes, and cross sections indicated on the drawings and specified herein.
- C. Utility lines and structures which are to remain in service shall be protected from damage as a result of the Company's operations. Where utility lines or structures not shown on the drawings are encountered, the Company shall report them to City Engineer before proceeding with the Design-Build Work. The Company shall bear the cost of repair or replacement of utility lines or structures which are shown on the drawings or otherwise made known to the Company which are broken or damaged by his operations.

1.04 SAFETY

- A. The Company shall at all times confirm to all applicable regulations of Subpart "P" entitled, "Excavation, Trenching, and Shoring of OSHA Safety and Health Regulations for Construction"; the Florida Trench Safety Act; and all applicable state and local rules and regulations.
- B. Company shall fully coordinate work and safety measures with other contractor's work with the Project site in accordance with Section 01040.

1.05 UNDERGROUND OBSTRUCTIONS

- A. Company shall be fully responsible for repairing utilities or structures damaged during construction, and shall be fully responsible for consequential damages resulting from damage to those utilities and structures if the damaged utilities or structures are shown on the drawings or otherwise made known to the Company prior to damage caused by the Company. In the event that the Company damages any existing utility lines, service lines, or structures, report thereof shall be made to City immediately. Repairs shall be to the satisfaction of the City and utility company owner. Utility company owners may perform repair work for which Company is responsible at Company's expense.

- B. If utility will not interfere with new Design-Build Work, maintain in service and protect from damage.
- C. If utility will interfere with new Design-Build Work, perform remedial work as directed by City or as shown on drawings. Exposure of any service or utility line shall be reported immediately to City so that necessary measures can be taken to prevent interruption of service, and any required outage of a service shall be scheduled with City and utility owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Trench Backfill. Trench Backfill shall consist of excavated on-site soils except when unsuitable soils are encountered, as determined by the City Engineer; the Company shall use material meeting the requirements of backfill as specified in Section 02200.
- B. Select Fill and Pipe Zone. Select fill shall meet the requirements of backfill as specified in Section 02200 except that the maximum particle size shall not exceed one inch in diameter.
- C. Pipe Bedding Material. As specified in Section 02200.
- D. Controlled Fill. As specified in Section 02200.
- E. Concrete. As specified in Section 03301.

PART 3 - EXECUTION

3.01 TRENCH EXCAVATION

- A. Excavation for trenches shall include the removal of material for the installation of pipe, electrical duct banks or other utilities and shall include the construction of trench shoring, stabilization measures, and necessary installations for dewatering as specified in Section 02200.
- B. Minimum Width of Trench. The minimum width of pipe trenches, measured at the crown of the pipe, shall be not less than 12 inches greater than the exterior diameter of the pipe, exclusive of bells. The minimum base width of such trench shall be not less than 12 inches greater than the exterior diameter of the pipe, exclusive of special structures or connections. Such minimum width shall be exclusive of trench supports and not greater than the width at the top of the trench.
- C. Maximum Width of Trench. The maximum allowable width of trench for pipelines measured at the top of the pipe shall be the outside diameter of the pipe (exclusive of bells or collars) plus 24 inches. A trench wider than the outside diameter plus 24 inches may be used with approval of the City Engineer. Such modifications shall be submitted to the City Engineer and approved in writing.
- D. Maximum Length of Open Trench. Except with special permission by the City Engineer, only that amount of pipe construction will be permitted which can be completed in one day, including excavation, construction of pipeline, and backfill in any one location. Maximum length of open trench shall never exceed 600 feet. This length shall include open excavation, pipe laying, and

appurtenant construction and backfill which has not been temporarily resurfaced. Surcharge loads due to construction equipment shall not be permitted within 5 feet of the top of excavated slopes. If the Company elects to shore or otherwise stabilize the trench sides, he shall submit shop drawings and calculations as specified in Section 02200.

- E. Excess Trench Excavation. A trench which, through the neglect of the Company, is excavated below the bottom grade required shall be refilled to the bottom grade, at the Company's expense, with bedding material as approved by City Engineer.

3.02 PIPE BEDDING

- A. The Company shall excavate at least a depth of one-fourth the outside diameter (4 inches thick minimum) below the bells or couplings for the full width of the trench. The pipe shall be bedded in compacted bedding material a minimum of one-fourth the outside pipe diameter (4 inches thick minimum) and shall extend vertically one-half the diameter above the pipe invert. Select fill shall be placed extending 12 inches above the top of the pipe. Remaining trench shall be backfilled with approved fill soils. Place bedding in uniform loose lifts not exceeding 6-inches thick and compacted to at least 90 percent of maximum dry density per the AASHTO T-180 (Modified Heavy Proctor) Test.
- B. Where trench material is suitable for, and approved by the City Engineer for, use as bedding, the trench may be excavated to a point above the invert grade, and the trench bottom handshaped so that the bottom quadrant of the pipe is firmly supported on undisturbed material.
- C. At pipe subgrade, if foundation soil in trench is soft, wet, spongy, or unstable, excavate to firm material and backfill with pipe bedding to provide stable base for placement of pipe and bedding.
- D. Before pipe is lowered in place, the trench bottom or bedding shall be prepared so that each pipe will have a firm and uniform bearing over the entire length of the barrel and a width equal to the bottom quadrant of the pipe. Adjustments in line and grade shall be made by scraping away or filling and tamping in under the barrel of the pipe. Wedging or blocking are not permitted.

3.03 BACKFILLING PIPE TRENCHES

- A. Backfilling Pipe Zone. The pipe zone shall be considered to extend 12 inches above the top of the pipe. Place Select Fill as specified herein in the trench simultaneously on each side of the pipe for the full width of the trench and the depth of the pipe zone in layers of six inches maximum in depth. Each layer shall be compacted to not less than 90 percent of maximum dry density, except under roadways and buildings where compaction shall be not less than 95 percent of maximum dry density. Care shall be taken not to damage pipe or special coatings on the pipe. Materials other than those specified shall be approved by City Engineer prior to use. The Company shall bear all cost of removal of rejected material, its hauling to an authorized disposal site, and cost of providing required material to complete the bedding and backfilling.
- B. Backfilling Pipe Trench. After the pipe has been laid in the trench and has been inspected and approved, and backfilling in the pipe zone is complete and compacted, the remainder of the trench may be backfilled with material excavated from the trench if said material is approved by the City Engineer and free of large rocks, woody material, peat and construction debris.
 - 1. Whenever imported borrow for backfill is required, furnish this borrow material and dispose of the excess trench excavation off site.

2. Imported borrow material shall conform to requirements of Section 02200.

- C. Placement and Compaction of Trench Backfill. Backfill shall be mechanically compacted to 90 percent of maximum density at optimum moisture content except that trench backfill compaction above the pipe zone shall be to a minimum of 95 percent in areas under buildings and roadways. Impact-type pavement breakers (stompers) will not be permitted over pipe. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements, or improvements installed under the Project. The Company shall make his own determination in this regard. Mechanically compacted backfill shall be placed in horizontal layers not exceeding 8 inches. Each layer shall be evenly spread; the moisture content brought to near optimum condition and then tamped or rolled until the specified compaction has been attained.
- D. Testing. The Company will provide compaction testing, one compaction test per 500 linear feet of trench lift, to determine compliance with specifications, as specified in Section 02200.

3.04 GENERAL PIPELINE INSTALLATION REQUIREMENTS

- A. Refer to Section 15060 for additional requirements.
- B. Depth of Pipe. Install pipelines at the elevations shown on the drawings. If elevations are not shown, piping shall be installed with cover adequate to resist construction loads, but in no instance shall cover be less than 4.0 feet.
- C. Changes in Line and Grade. In the event obstructions not shown on the drawings are encountered during the progress of the work which will require alterations, the City Engineer shall have the authority to change the drawings and order the necessary deviation from the line or grade. The Company shall not deviate from the specified line and grade without approval by the City Engineer.
- D. Installing Pipe. Company shall, after excavating the trench and preparing the bedding for the pipe, furnish necessary facilities for lowering and placing sections of the pipe in the trench without damage. Nylon slings or other methods and equipment approved by the City Engineer shall be used for unloading, loading and lowering pipe into the trench. Hooks, wire rope slings or other equipment which may damage the pipe interior or exterior coatings will not be permitted. The sections of pipe shall be fitted together in accordance with the manufacturer's requirements and shall be laid true to line and grade in accordance with the drawings. The full length of the barrel of the pipe shall have a uniform bearing upon 4 inches of bedding material. If the pipe has a projecting bell, suitable excavation shall be made to receive the bell. The bell shall not bear on the subgrade.
1. Pipe shall be laid up grade. Pipe which is not in true alignment, both vertical and horizontal, or shows undue settlement after laying shall be replaced. No pipe shall be laid which is damaged, cracked, checked, or spalled or has other defects deemed by the City Engineer to make it unacceptable. Such unacceptable sections shall be permanently removed from the Design-Build Work.
 2. When the work of installing pipe is not in progress, openings into the ends of the pipelines shall be kept tightly closed with suitable plywood or sheet metal bulkheads.
 3. Keep the pipe trench free from water and take necessary precautions to prevent the pipe from floating due to water entering the trench. No pipe shall be laid in or under water.

3.05 CLEAN-UP

- A. The provisions of Section 02200 apply.

END OF SECTION

SECTION 02500
BASE COURSES AND PAVING

PART 1 - GENERAL

1.01 SCOPE

- A. Provide street, service drive and other pavements to the lines, grades, and dimensions as shown on the drawings and specified herein.
- B. Related Design-Build Work Specified Elsewhere:
 - 1. Earthwork and Site Preparation, Section 02200.
 - 2. Trenching, Backfilling and Compaction, Section 02221.
 - 3. Concrete and Reinforcing, Section 03301.

1.02 SUBMITTALS

- A. The Company shall submit the following to the County Administrator with copy to City Engineer in accordance with the provisions of Appendix 5 of the Service Contract:
 - 1. List identifying the types and sources of materials proposed for this Design-Build Work.
 - 2. Laboratory test reports for tests performed in the process of mix design.
 - 3. Material certificates, signed by the material producer and the Company, certifying that each material item complies with, or exceeds, specified requirements.

1.03 REFERENCE STANDARDS

- A. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

PART 2 - PRODUCTS

2.01 BASE AND PAVEMENT

- A. Base.
 - 1. Subgrade and base preparation shall be as specified in Section 02221. Limerock base shall meet the requirements of Section 911, Limerock Material for Base and Stabilized Base, of the FDOT Standard Specifications for Road and Bridge Construction.
- B. Prime Coat.
 - 1. Asphalt prime coat shall be asphalt emulsion Type RS-2, CRS-2 or liquid asphalt RC-70 or RC-250 conforming to Section 916 of the FDOT Standard Specifications.

C. Pavement.

1. Asphalt concrete paving shall be Type S-1 hot plant mix and all materials shall conform to the requirements of Section 331 of the FDOT Standard Specifications.

D. Tack Coat and Seal Coat.

1. Asphalt emulsion shall be RS-2, SS-1 or SS-1H conforming to Section 916 of the FDOT Standard Specifications.

E. Traffic and Parking Stripes.

1. The paint used for traffic and parking stripes shall conform with the requirements of Section 971-12 of the FDOT Standard Specifications for Road and Bridge Construction, or, at the Company's option, fast dry traffic paint as specified in Section 971-13. Paint shall be white or yellow as shown on the drawings. Paint for handicap parking spaces and handicap symbols shall be blue.

PART 3 - EXECUTION

3.01 GENERAL

- A. Construct new subbase, base and surface treatment for all roadways and parking areas as shown on the drawings.
- B. Repair of all paving cuts from pipe installations and other cuts or damage resulting from the Company's activities.
- C. Provide pavement striping and markings as shown on the drawings.

3.02 PLACEMENT OF LIMEROCK BASE

- A. Place base material only on properly prepared compacted subgrade and spread and shaped so that base material will have a finished thickness not to exceed 8 inches when compacted.
- B. Complete all required manipulation the same day material is deposited.
- C. Compact base material to 90 percent maximum density as determined by procedures described in ASTM D1557.

3.03 PLACEMENT OF ASPHALT CONCRETE PAVEMENT

A. Tack Coat.

1. Tack coat shall be applied to existing pavements to be patched or overlaid and all faces against which asphalt concrete pavement is to be placed. Tack coats shall be applied with an approved sprayer and at a uniform rate.

B. Prime Coat.

1. Prime coats shall be applied with an approved sprayer and at a uniform rate.

C. Laying.

1. Surface Course Material. Surface course shall be 1-1/2 inches in thickness and shall be spread in one lift. The finished course shall be smooth, of uniform density, and will be to section, line and grade as shown.

D. Rolling.

1. Begin rolling while pavement is still hot and as soon as it will bear the roller without undue displacement or hair cracking. To prevent adhesion of surface mixture to the roller, keep wheels properly moistened with water. Excessive use of water will not be permitted.
2. Compress the surface thoroughly and uniformly, first with power-driven, 3-wheel, or tandem rollers weighing from 8 to 10 tons. Obtain subsequent compression by starting at the side and rolling longitudinally toward the center of the pavement, overlapping on successive trips by at least one-half width of the rear wheels. Make alternate trips slightly different in length. Continue rolling until no further compression can be obtained and all rolling marks are eliminated.
3. Use a tandem roller for the final rolling. Double coverage with an approved pneumatic roller on asphaltic concrete surface is acceptable after flat wheel and tandem rolling has been completed.

E. Hand Tamping.

1. Along walls, curbs, headers and similar structures, and in all locations not accessible to roller, compact the mixture thoroughly with a vibrating plate compactor.

F. Construction Joints.

1. When new asphalt is laid against existing or old asphalt, the existing or old asphalt shall be saw cut to provide a straight smooth joint.

G. Defective Pavement.

1. Recompact pavement sections not meeting specified densities or replace them with new asphaltic concrete material. Replace with new material sections of surface course pavement not meeting surface test requirements or having an unacceptable surface texture. Patch asphalt pavement sections in accordance with procedures established by the Asphalt Institute. At no change in the contract sum, replace asphalt pavement sections which did not meet the specifications.

3.04 STORM INLETS

- A. New storm inlets shall be constructed to meet the finished pavement grades.

3.05 PAVEMENT STRIPING

- A. Pavement and parking striping shall be of the colors and dimensions shown on the drawings.
- B. Striping equipment and the methods of application shall be as specified in Section 710 of the FDOT Standard Specifications for Road and Bridge Construction.

- C. Where shown on the drawings, curbs shall be painted.
- D. Stripping shall be protected from traffic and other damage until the paint has thoroughly dried.
- E. Damaged or misaligned striping shall be removed and replaced as specified in the FDOT Standard Specifications.

3.08 TESTING

Testing for roadways and parking areas shall be as set forth in the FDOT Standards and the following:

- A. Subgrade compaction tests, four for each 500 square yards of subgrade.
- B. Four LBR tests for each 500 square yards of base course.
- C. Two, 2-1/2 inch diameter cores for each 500 square yards of asphaltic concrete surface for measurement of stabilized base, base course and surface course thickness.
- D. Upon completion of the finished surfaces shall be tested with a 15 foot straight edge. All deficiencies in excess of 3/16 inches shall be corrected in accordance with FDOT Standards, Section 330-12.4.

3.09 TIME OF APPLICATION AND CLEAN-UP

- A. Immediately prior to final acceptance all paved surfaces shall be power broomed to remove all soil and other debris.

END OF SECTION

SECTION 02751 - CEMENT CONCRETE PAVEMENT**1.1 SUMMARY**

- A. Driveways and roadways.
- B. Parking lots.
- C. Curbs and gutters.
- D. Walkways.
- E. Unit paver base.

1.2 QUALITY ASSURANCE

- A. Design mixture for concrete.
- B. Quality Standard: ACI 301, "Specification for Structural Concrete."
- C. Mockups.

1.3 MATERIALS

- A. Reinforcement:
 - 1. Welded Wire Reinforcement: **[Plain] [Deformed] [Epoxy-coated]** steel.
 - 2. Reinforcing Bars and Tie Bars: **[Deformed] [Epoxy-coated deformed] [Galvanized deformed]** steel.
 - 3. Steel bar mats.
 - 4. Synthetic Fiber: **[Fibrillated] [Monofilament]**.
- B. Concrete:
 - 1. Portland Cement: ASTM C 150.
 - 2. Aggregate: Normal-weight aggregate.
 - 3. Admixture: Air entraining.
 - 4. Compressive Strength: **[4500 psi (31 MPa)] [4000 psi (27.6 MPa)] [3500 psi (24.1 MPa)] [3000 psi (20.7 MPa)]** at 28 days.
- C. Membrane-Forming Curing Compound: **[Clear] [White]** waterborne.
- D. Related Materials:
 - 1. Expansion- and Isolation-Joint-Filler Strips: **[Cellulosic fiber] [Cork]**.
 - 2. Color pigment.
 - 3. Pavement-Marking Paint: **[Alkyd resin] [Latex]**.
 - 4. Wheel Stops: **[Precast concrete] [Recycled HDPE or plastic]**.

1.4 FINISHING

- A. Finishes: [**Burlap**] [**Medium-to-fine-textured broom**] [**Medium-to-coarse-textured broom**] [**Monolithic exposed-aggregate**] [**Seeded exposed-aggregate**] [**Slip-resistive aggregate**] [**Rock-salt**] [**Pigmented mineral dry-shake hardener**] finish.

1.5 FIELD QUALITY CONTROL

- A. Testing: By **Company**-engaged agency.

END OF SECTION 02751

SECTION 02811
LANDSCAPE IRRIGATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This specification provides a guide of items to be included and a detailed description is provided only for items of special manufacturer or type. The Company must examine the drawings and specifications carefully and include all items normally required for a complete underground sprinkler system. In general work includes, but is not limited to, the following major items:
 - 1. Pipe and fittings, valves, sprinkler heads, emitters, bubblers and accessories.
 - 2. Control system.
 - 3. Water source connection.
 - 4. Testing and start-up.

1.02 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Section 02938 - Sodding.
- C. Section 02950 - Trees, Plants and Ground Cover.
- D. Section 15060 - Piping and Appurtenances.
- E. Section 02221 - Trenching, Backfilling and Compaction.

1.03 REFERENCES

- A. ANSI/ASTM D2564 - Solvent Cement for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
- B. ASTM D2241 - Poly (Vinyl Chloride) (PV C) Plastic Pipe (SDR-PR).

1.04 SYSTEM DESCRIPTION

- A. Electric solenoid controlled underground irrigation system.

1.05 SUBMITTALS

- A. Submit manufacturer's product data and installation instructions for each of the system components to the County Administrator with copy to City Engineer, in accordance with Appendix 5 of the Service Contract.
- B. Product Data: Provide component and control system and wiring diagrams.
- C. Irrigation Company documented experience in performing similar projects for the last five (5) years.

- D. Irrigation Company shall provide irrigation sleeve plan to Company prior to any paving or walkway installation.
- E. Submit the following material samples:
 - 1. Piping and fittings.
 - 2. Clamps.
 - 3. Wire connectors and sealer.

1.06 PROJECT RECORD DOCUMENTS

- A. Provide irrigation system record drawings.
 - 1. Legibly mark drawings to record actual construction.
 - 2. Indicate horizontal and vertical locations, referenced to permanent surface improvements.

1.07 OPERATION AND MAINTENANCE DATA

- A. Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog, as specified in Appendix 11 of the Service Contract.
- B. Provide schedule indicating length of time each valve is required to be open to provide a determined amount of water.

1.08 QUALITY ASSURANCE

- A. Accountable Manufacturers: All materials shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable specified manufacturer, except as otherwise specifically provided in the Design Documents. All materials to be incorporated in this system shall be new and without flaws or defects obtained from a single acceptable manufacturer where applicable, and of quality and performance as specified and meeting the requirements of this system.
- B. Obtain City Engineer's acceptance of installation and testing irrigation system prior to installing backfill materials.

1.09 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three (3) years documented experience.
- B. Installer: Company specializing in performing the work of this Section with minimum of five (5) years documented experience.

1.10 REGULATORY REQUIREMENTS

- A. Materials, equipment, and methods of installation shall comply with the following codes and standards:
 - 1. All local City, County or State applicable codes.
 - 2. National Fire Protection Association (NFPA): National Electric Code.

3. American Society for Testing and Materials (ASTM).
4. The Irrigation Association (IA).

1.11 PRE-INSTALLATION CONFERENCE

- A. The Company, Irrigation System Installer and the City Engineer shall convene one (1) week prior to commencing work of this Section.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.
- B. Deliver plastic piping in bundles, packaged to provide adequate protection of pipe ends, both threaded or plain.
- C. Store and handle materials to prevent damage and deterioration.
- D. Provide secure, locked storage for valves, sprinkler heads, and similar components that cannot be immediately replaced, to prevent installation delays.

1.13 PROJECT CONDITIONS

- A. Known underground and surface utility lines are indicated on the drawings.
- C. Protect existing trees, plants, lawns, and other features designated to remain as part of the final landscape work.
- D. Promptly repair damage to adjacent facilities caused by irrigation system WORK operations. Cost of repairs at Company's expense.
- E. Promptly notify the City Engineer of unexpected sub-surface conditions.
- F. Irrigation system layout is diagrammatic. Exact locations of piping, sprinkler heads, valves, and other components shall be established by Company in the field at time of installation.
 1. Space sprinkler components as indicated.
 2. Minor adjustments in system layout will be permitted to clear existing fixed obstructions. Final system layout shall be acceptable to the City Engineer.

1.14 COORDINATION

- A. Coordinate the Design-Build Work with site backfilling, landscape grading and delivery of plant life.

1.15 WARRANTY

- A. It shall be the Company's responsibility to ensure and guarantee complete coverage of the areas shown on the drawings to be irrigated. He shall also guarantee the satisfactory operation of the entire system and the workmanship and restoration of the area. The entire system shall be guaranteed to be complete in every detail for a period of one (1) year from the date of its final

acceptance, and Company shall repair or replace any such defects occurring within that year, free of expense to the City.

1.16 SPARE MATERIALS

A. Furnish the following spare materials:

1. Two (2) sprinkler heads of each type and each size.
2. Two (2) valve keys for manual valves.
3. Two (2) valve box keys.
4. Two (2) keys for valve markers.
5. Two (2) wrenches for each type head core and for removing and installing each type head.

PART 2 - PRODUCTS

2.01 PIPE MATERIALS

A. Polyvinyl Chloride Pipe (PVC):

1. Laterals: Polyvinyl chloride (PVC) pipe shall conform to the requirements of ASTM Designation D 2241, Class 1120 or 1220. All lateral piping less than 3" in diameter shall be Class 160, or Schedule 40.
2. Main Line Under Pressure: Polyvinyl chloride (PVC) pipe shall conform to the requirements of ASTM Designation D 2241, Class 1120 or 1220, Class 160, or Schedule 40.
3. Pipe Markings: All PVC pipe shall bear the following markings:
 - a. Manufacturer's name
 - b. Nominal pipe size
 - c. Schedule or class
 - d. Pressure rating of P.S.I.
 - e. NSF (National Sanitation Foundation) approval
 - f. Date of extrusion

B. PVC Fittings:

1. Fittings for PVC Pipe: Shall be Schedule 40 PVC with solvent weld joints and conform to the requirements of ASTM Designation D 2467 and D 2464 respectively and furnished by manufacturer of pipe.
2. All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable I.P.S. schedule and NSF seal of approval.

C. PVC Joints: Joints in PVC pipe smaller than 3 inches shall be solvent welded in accordance with the recommendation of the pipe manufacturer using the solvent cleaner and welding compound furnished with the pipe.

D. Pressure Pipe and Main Line Pipe through Buildings: Both shall be PVC Schedule 40 with Underwriters Laboratories label. Pipe size shall be as shown on the drawings.

E. Sleeves:

- a. General: The Company shall make any adjustments necessary to accommodate existing vegetation, utilities, or other conditions. Sleeving shall be minimum of 18" below Finish Grade.
- b. Sleeve material: Schedule 40 PVC Pipe.

2.02 SPRINKLER HEADS

- A. Sprinkler heads shall be pop-up type, as manufacturers by Rain Bird Sprinkler Manufacturing Corp. and Hunter.

2.03 VALVES

A. Automatic Remote Control Valves:

1. The automatic remote control valves shall be Rain Bird PESB Series, Electric Solenoid operated valves. The valve shall be a Solenoid actuated, combination valve which may be used as angle or globe screwed pattern type. The Solenoid shall be completely epoxy encapsulated for positive waterproofing with a stainless steel shunt band. The valve shall be normally closed design.
2. All valves shall have a flow control mechanism and be capable of manual operation.
3. In all cases where valves are used they shall be proceeded by a PVC compression fitting on the downstream side of valve.
4. All valves shall be installed in accordance with all manufacturers' recommendations and shall be fully warranted by the Company.
5. The automatic control valves shall be as manufactured and supplied by Rain Bird Sprinkler Manufacturing Corporation, Glendora, CA or approved equal.

C. Valve Box and Cover:

1. All remote control valves shall be encased in an Ametek VP-10 valve box. Each valve box shall be set with top-most surface at finished grade.
2. Valve box shall be manufactured by "Ametek" Plymouth Products Division, Sheboygan, WI.

2.04 CONTROLS

A. Automatic Controller

1. The automatic controller shall be by Rain Bird Sprinkler Manufacturing Corporation.
2. The Company shall install the controller with all necessary devices - including lighting protection power input, lightning protection time circuit. The controller shall be grounded for lightning protection in accordance with all manufacturers' specifications.
3. All local and applicable codes shall take precedence in the furnishing and/or connecting of the 110 volt electrical service to the controller.

B. Control Cable

1. Control cables shall be single wire minimum size #14 for common ground and for control wire. All cable shall be copper wire with minimum 4/64" covering of I.C.C. - I.D.D. compound insulation and shall meet U.L. approved standards for Type UP 600V, single wire direct burial

direct burial cable.

C. Electric Work:

1. It shall be the Company's responsibility to make all necessary electric hookups and installations.

D. Snap-Tite Wire Connector and Sealer:

1. Rain Bird Model No. ST-03 Snap-Tite and PT-S5 Sealer combine to make waterproof underground wire connections for use with 2- and 3- wire, 18 through 10 gauge connections.
2. Shall be corrosion-resistant PVC construction, quick assembly, inverted check valve flaps, three (3) flapped openings, copper crimp sleeve and Underwriters Laboratory (U.L.) listed.
3. Shall be as manufactured and supplied by Rain Bird Sprinkler Manufacturing Corporation, Glendora, CA or approved equal.

E. Wire Conductors: Color coded.

PART 3 - EXECUTION

3.01. EXAMINATION

- A. Verify site conditions.
- B. Verify location of existing utilities.
- C. Verify that required utilities are available, in proper location, and ready for use.

3.02 PREPARATION

- A. Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, and structures. Avoid locating valves in pavement.
- B. Layout and stake locations of system components.
- C. Review layout requirements with other affected work. Coordinate locations of sleeves (under paving) to accommodate system.
- D. Preparation for Setting Irrigation Heads: Setting of all sprinkler heads shall be only after finished grade has been set.

3.04 TRENCHING

- A. Trench Size: (Irrigation Pipe Only)
 1. Minimum Width: 6 inches
 2. Minimum Cover Over Installed Supply Piping: 18 inches
 3. Minimum Cover Over Installed Branch Piping: 18 inches
 4. Minimum Cover Over Installed Outlet Piping: 12 inches

- B. All trenching or other work under the limb spread of any and all evergreens shall be done by hand or by methods so that no limbs or branches are damaged in any way. Trenching around existing plant material and as per the schedule below for existing trees, shall be done by hand so as to minimize root disturbance:

Existing Tree Schedule

1" caliper	3' from tree trunk
2" caliper	4' from tree trunk
3" caliper	5' from tree trunk
4" caliper	6' from tree trunk
5" caliper	8' from tree trunk
6" caliper	10' from tree trunk

- C. Trench to accommodate grade changes and slope to drains.
- D. Maintain trenches free of debris, material, or obstructions that may damage pipe.

3.05 INSTALLATION

A. Excavating:

1. All excavation shall be considered unclassified excavation and include all materials encountered.
2. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings.
3. Excavate to depths required to provide 2" depth of earth fill or sand bedding for piping if rock or other unsuitable bearing material is encountered.
4. Excavate trenches and install piping and fill during the same working day. Do not leave open trenches or partially filled trenches open overnight.

B. Plastic Pipe:

1. Saw cut plastic pipe. Use a square-in-sawing vice, to ensure a square cut. Remove burrs and shavings at cut ends prior to installation.
2. Pipe shall be cleaned with an approved solvent (Methyl ethyl ketone, acetone, or tetrahydrofuran). Solvent cement shall then be applied full strength to both the pipe and fittings. All solvent cement used shall contain at least 15 percent by weight of the same PVC compound used in making the fittings.
3. All pipelines shall be laid in trenches with a minimum of 12" cover.
4. Make plastic to metal joints with plastic male adapters.
5. Allow joints to set at least 24 hours before pressure is applied to the system.
6. The Company shall not install solvent weld pipe when air temperature is below 50 degrees F.
7. Maintain pipe interiors free of dirt and debris. Close open ends of pipe by acceptable methods when pipe installation is not in progress.
8. After all new sprinkler piping and risers are in place and connected, for a given zone, and all necessary division work has been completed, and prior to the installation of sprinkler heads, all control valves shall be opened and a full head of water used to flush out the system.

C. Sprinkler Heads:

1. General Provisions:

- a. Sprinkler heads shall be installed as designated on the DRAWINGS. Heads shall be installed on triple swing joint risers. Angled nipple relative to lateral line shall be no more than 45° or less than 10°. Top to be flush with finish grade or top of curb.
- b. Spacing of heads shall not exceed the maximum indicated on the drawings. In no case shall the spacing exceed the maximum recommended by the Manufacturer.

2. Head Types:

- a. Spray Pop Up Sprinkler Heads: Shall be installed on Toro "Funny Pipe" and be set with top of head flush with finished grade. Sprinkler heads placed adjacent to walks and curbs will be installed 6" from concrete. Sprinkler heads placed adjacent to pavement having no curb shall be installed 18" from the edge of pavement.
- b. Riser Mounted Spray Sprinkler Heads: Shall be installed on Schedule 40 PVC risers and be set with top of head minimum 6" above plant/shrub material. All exposed PVC shall be painted with flat black paint.

D. Electric Controller, Control Cable, Wire Connection, Control Valves:

1. The Controller shall be installed with all necessary devices and proper grounding for lightning protection in accordance with the manufacturer's recommendations and the equipment used.
2. The systems shall be programmed by the Company to allow a complete water cycle of all stations.
3. All electrical control cable shall be of size as specified by manufacturer and shall be installed in the piping trenches under irrigation mains wherever possible. Wire shall be "snaked" into the trench loose with slack to allow for expansion and contraction of the wire. If it is so desired, rather than leaving slack in the wire, expansion joints in the wire may be provided at 100-foot intervals by making five (5) to six (6) loose turns of the wire. Where it is necessary to run wire in a separate trench, the wire shall have a minimum cover of 12".

All wire connections at remote control valves, either direct buried or in control boxes, and at all wire splices, the wire shall be left with sufficient "slack" so that in case of repair the valve bonnet or splice may be brought to the surface without disconnecting the wires.
4. Connect remote control valves to a common ground wire system independent of all other controllers.
5. Wire connections to remote control electric valves and splices or wire in the field shall be made in the following manner, using Rain Bird Snap-Tite wire connectors and sealing cement:
 - a. Strip ends of wire and push wires through the holes of the base socket.
 - b. Twist ends of wires together and mechanically bond together using crimp sleeve and crimp pliers.
 - c. Pull wire connection back into base socket as far as possible.
 - d. Apply solvent cement to outside of sealing plug and then fill cavity of sealing plug completely with solvent.
 - e. Push sealing plug into base socket, using slight twisting motion, until it bottoms.
 - f. Push wires down into base plug as far as they will go, without unseating sealing plug. This assures cement completely sealing around wire insulation and waterproofing the

connection. It is important that the joint be absolutely waterproof so that there is no chance for leakage of water and corrosion build-up on the joint.

6. The Company shall connect electric control valves to controllers in a clockwise sequence to correspond with station settings, beginning with Stations 1, 2, 3, etc. Automatic controllers shall be provided and installed by the Company.
7. Electric Control Valves: Shall be installed in specified valve boxes. The valve shall have 6" of pipe bedding installed below the bottom of the valve. The valve shall be connected to the main line. If the valve box does not extend to the base of the valve, a valve box extension shall be installed. Electric control valves shall be installed where shown and grouped together where practical. The Company shall place valves no closer than 12 inches to walk edges, buildings and walls. The Company shall adjust the valve to provide flow rate or rated operating pressure required for each sprinkler circuit.

- E. Miscellaneous Pipe Fittings and Adjustments: The Company shall furnish and install all other pipe and fittings. It shall further be the responsibility of the Company to furnish and construct or install at no additional cost to the City any reasonable intended items not specifically mentioned in these specifications or not shown on the drawings but necessary to provide a complete job acceptable to the City.

3.06 BACKFILLING

- A. Initial backfill on PVC line shall be pulverized native soil, free of foreign matter. Within radius of 4" of the pipe shall be clean soil or sand. Plant locations shall take precedence over sprinkler and pipe locations. The Company shall coordinate the placing of specimen trees and shrubs with the routing of lines and final head locations.
 1. Backfill and Compactions: The Company shall leave trenches slightly mounded to allow for settlement after the backfilling is completed. The Company shall clean the site of the work continuously of excess waste materials as the backfilling progresses, and leave in a neat condition. Protect open trenches as required.
 2. The Company shall carefully backfill excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand, and other approved materials, free of rocks and debris over 1" in size. Backfill shall be compacted to original density of surrounding soil without dips, sunken areas or irregularities.
 3. The Company shall conform to requirements specified in Section 02221 for methods and required compaction percentage for pipe trenches.
 4. The Company shall hand place the first 6" of backfill (or to top of pipe) and have it walked on so as to secure the position of the pipe and wire.
 5. No wheel rolling will be allowed. The Company shall remove rock or debris extracted from the backfill material and dispose of off-site. The Company shall fill any voids left in backfill with approved backfill material.

3.07 CONNECTION TO WATER SOURCE

- A. The Company shall connect the irrigation system to the site water source.

3.08 ADJUSTING

- A. Adjust control system to achieve time cycles required.

- B. Change head types for full water coverage as directed.

3.09 CLEARING

- A. Stockpile, haul from site, and legally dispose of waste materials, including unsuitable excavated materials, rock, trash, and debris.
- B. Maintain disposal route clear, clean, and free of debris.

3.10 FLUSHING AND TESTING

- A. Flushing:
 - 1. Before sprinkler heads are set, the Company shall flush the lines thoroughly to make sure there is no foreign matter in the lines.
 - 2. The Company shall flush the main lines from dead end fittings for a minimum of five minutes under a full head of pressure.
- B. Testing:
 - 1. The Company shall notify the City Engineer and City forty-eight (48) hours in advance of testing.
 - 2. Prior to backfilling of mainline fittings, Company shall fill the Main Line Piping with water, in the presence of the City Engineer, taking care to purge the air from it by operating all the sprinkler control valves one or more times and/or such other means as may be necessary. A small, high pressure pump or other means of maintaining a continuous water supply shall be connected to the Main Line and set so as to maintain 100 psig in the Main Line system for two (2) hours without interruption. When this has been accomplished and while the pressure in the system is still 100 psig, leakage testing shall be performed in accordance with AWWA Standard C-600. Pressure readings shall be noted and make up water usage shall be recorded. Should the rate of makeup water usage indicate significant leakage, the source of such leakage shall be found and corrected and the system then retested until the City Engineer is satisfied that the system is reasonably sound. Lateral time testing shall be conducted during the operating testing of the system by checking visually the ground surface until no leaks in this portion of the system are evident. Leaks shall be repaired by the Company at any time they appear during the warranty period.
- C. Adjustment and Coverage of System: Coordinate pressure testing with adjustments and coverage test of system so both may occur at the same time. The Company shall balance and adjust the various components of the system so that the overall operation of the system is most efficient. This includes synchronization of the controllers, adjustments to pressure regulators, pressure relief valves, part circle sprinkler heads, and individual station adjustments on the controllers.

3.11 ACCEPTANCE

- A. Test and demonstrate to the City Engineer and City the satisfactory operation of the system free of leaks.
- B. After final inspection and acceptance of system by City, it will be the Company's responsibility to maintain the system in working order during the guarantee period, performing necessary minor

maintenance, keeping grass from obstructing the sprinkler heads, protecting from landscape maintenance operations.

END OF SECTION

SECTION 02830
CHAIN LINK FENCE AND GATE

PART 1 - GENERAL

1.01 SCOPE

- A. The work in this Section includes the following:
 - 1. Furnish and install new fence; including fabric, posts, bracing, gates, and appurtenances as specified.
- B. Related work specified elsewhere:
 - 1. Earthwork and Site Preparation, Section 02200
 - 2. Trenching, Backfilling and Compacting, Section 02222.
 - 3. Concrete and Reinforcing, Section 03301.

1.02 STANDARD SPECIFICATIONS

- A. All work and materials shall conform to the applicable or referenced portions of the latest edition of the Florida Department of Transportation (FDOT) Design Standards and Standard Specifications for Road and Bridge Construction.

1.03 SUBMITTALS

- A. Shop drawings for fence, rolling gate, gate hardware and motorized sliding operator/controller shall be submitted to the County Administrator with copy to City Engineer in accordance with the requirements of Appendix 5 of the Service Contract.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials for chain link fence and gate shall conform to the requirements of Index 802, Fence B with Barb Wire attachment, as specified in FDOT Design Standards and Section 550 of FDOT Standard Specifications.
 - 1. Posts, gate frames, and rails shall be Schedule 40 galvanized tubular steel conforming to Table X2 of ASTM A 53.
 - 2. Chain link fence shall be 2-inch mesh, polyvinyl chloride coated steel, No. 9 gauge per AASHTO M181 Type IV, with twisted and barbed selvage top and bottom.
 - 3. Provide three strand barbed wire attachment for entire length of fence.
 - 4. Tension wire shall be steel wire, No. 7 gauge zinc galvanized.
 - 5. Tie wire shall be steel wire, No. 9 gauge zinc galvanized.

- B. Concrete for post footings shall comply with the requirements of Section 03301, for 3,000 psi concrete.
- C. Slide gate operator shall be ½ hp medium duty, 115 VAC, single phase, thermally protected, open frame-resilient mount PSC motor. Operator shall have remote keypad as manufactured by AAS model ADV-1000, or equal. Operator shall include AC transformer, 12 volt battery, a padlockable control box/board, receiver with 20-foot cable, 32-foot chain, all mounting hardware, caution signs, warning beeper and adjustable obstacle-reversing safety feature. Sliding gate and operator shall be by Hoover Fence Co. or equal.
- D. Company to supply, program, and install remote gate entry keypad, weight sensors, limit switches, intrusion switches and gate sensors. Company shall emulate all signals into SCADA, (RTU-1), via interposing relays etc. for control and monitoring
- E. Fabricate gate true to size. Gates shall be braced to prevent sag. Gate hardware shall be as follows:
 - 1. The cantilever type sliding gate shall be equipped with rollers/tires. Rollers shall have safety guards.

PART 3 - EXECUTION

3.01 GENERAL

- A. Installation of the chain link fence shall conform to Section 550 of the FDOT Standard Specifications unless specified otherwise herein. Completed installation shall be plumb, secure, true to line and free of flaws. Gate and hardware shall be adjusted to provide freedom of operation without twist or binding.

3.02 POST ANCHORAGE

- A. Set all posts in concrete bases to accurately align the fence.

3.03 FABRIC INSTALLATION

- A. The wire fabric shall be placed on the outward facing side of the posts, stretched taut, and securely fastened.

3.04 GATE

- A. Gate shall be complete with rollers, guides and sliding operator equipment. Gate shall not bind or sag and shall operate smoothly. The finished grade at gates shall be adjusted as required to provide the specified sliding length of the gate to completely clear the road.

END OF SECTION

SECTION 02900

LANDSCAPING

PART 1 - GENERAL

1.01 SCOPE OF WORK:

- A. Work included in this Section includes furnishing and installing sod.

1.02 REFERENCE DOCUMENTS

- A. The materials used in this work shall conform to the requirements of Florida Department of Transportation Standard Specifications for Road and Bridge Construction as follows:
 - 1. Sod - Section 981-2
 - 2. Fertilizer and Dolomitic Limestone - Section 982
 - 3. Water - Section 983

1.03 SUBMITTALS

- A. Company shall submit certifications and identification labels for all trees and sod supplied to the County Administrator with copy to City Engineer in accordance with Appendix 5 of the Service Contract.

1.04 RELATED WORK

- A. Temporary Erosion and Sedimentation Control is included in Section 01510.
- B. Site Preparation is included in Section 02200.

PART 2 - PRODUCTS

2.01 SOD

- A. Types: Sod may be of either centipede or bahia grass, at the Company's option. It shall be well matted with roots.
- B. The sod shall be taken up in commercial-size rectangles, preferably 12-inch by 24-inch or larger, except where 6-inch strip sodding is called for.
- C. The sod shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh and uninjured at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses. It shall be planted as soon as possible after being dug and shall be shaded and kept moist from the time it is dug until it is planted.

- D. Sod should be handled in a manner to prevent breaking or other damage. Sod shall not be handled by pitch forks or by dumping from trucks or other vehicles. Care shall be taken at all times to retain the native soil on the roots of each sod roll during stripping and handling. Sod that has been damaged by handling during delivery, storage or installation will be rejected.

2.02 MULCH

- A. The mulch material used shall normally be dry mulch. Dry mulch shall be straw or hay, consisting of oat, rye, or wheat straw, or of pangola, peanut, coastal bermuda or bahia grass hay. Only undeteriorated mulch which can readily be cut into the soil shall be used.

2.03 FERTILIZER

- A. Chemical fertilizer shall be supplied in suitable bags with the net weight of the contents and guaranteed analysis shown on the container. Bulk shipments shall be accompanied by an analysis and net weight certification of the shipment. Fertilizer shall be 12-8-8 and comply with Section 982 of the FDOT Standard Specification for Road and Bridge Construction.
- B. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid and (3) water soluble potash, contained in the fertilizer.
- C. The chemical designation of the fertilizer shall be 12-8-8, with at least 50 percent of the nitrogen from a nonwater-soluble organic source. The nitrogen source may be an ureaformaldehyde source provided it is not derived from a waste product of the plastic industry.

2.04 EQUIPMENT

- A. The device for spreading fertilizer and dolomitic limestone shall be capable of uniformly distributing the material at the specified rate.
- B. The seed spreader shall be an approved mechanical hand spreader or other approved type of spreader.
- C. The mulching equipment shall be of a type capable of cutting the specified materials uniformly into the soil and to the required depth. Harrows will not be allowed.
- D. A cultipacker, traffic roller, or other suitable equipment will be required for rolling the sodded areas.

PART 3 - EXECUTION

3.01 SOD BED PREPARATION

- A. Areas to be sodded shall be cleared of all rough grass, weeds, and debris, and brought to smooth even grade.
- B. The soil shall then be thoroughly tilled to a minimum 8-inch depth.
- C. The areas shall then be brought to proper grade, free of sticks, stones, or other foreign matter over 1-inch in diameter or dimension. The surface shall conform to finish grade, less the thickness of sod, free of water-retaining depressions, the soil friable and of uniformly firm texture.

3.02 INSPECTION

- A. Verify that soil preparation and related preceding work has been completed.
- B. Do not start work until conditions are satisfactory.

3.03 SOD HANDLING AND INSTALLATION

- A. During delivery, prior to planting, and during the planting of sod areas, the sod panels shall at all times be protected from excessive drying and unnecessary exposure of the roots to the sun. All sod shall be stacked during construction and planting so as not to be damaged by sweating or excessive heat and moisture.
- B. After completion of soil conditioning as specified above, sod panels shall be laid tightly together so as to make a solid sodded lawn area. On mounds and other slopes, the long dimension of the sod shall be laid perpendicular to the slope. Immediately following sod laying the lawn areas shall be rolled with a lawn roller customarily used for such purposes, and then thoroughly watered.
- C. Sod shall be placed at all areas where sod existed prior to construction, on slopes of 3 horizontal on 1 vertical (3:1) or greater, in areas where erosion of soils will occur, and as directed by the Engineer.

3.04 INSPECTION

- A. On completion of the Work, the Engineer will inspect all sod planting. The Company shall repair or replace all defective work, whichever is unsatisfactory to the Engineer. Preliminary acceptance of all sod materials will be given only after the materials are planted and after meeting all requirements prescribed herein.

3.05 Guarantee and Maintenance of SOD

- A. Guarantee:
 - 1. The Company shall guarantee all sod for a period of six months from the date of acceptance of the completed overall project from the Company.
 - 2. The Company shall guarantee the sod shall be alive, free of disease and have a healthy appearance at the end of the guarantee period.
 - 3. During the guarantee period, the Company shall replace any sod which is diseased, dead or visually unsightly within 3 days when requested in writing.
- B. Maintenance:
 - 1. The Company shall maintain all sod guaranteed above for the period of the guarantee. Such maintenance shall include filling, leveling, and repairing eroded areas, replanting areas where the establishment of the sod does not develop satisfactorily, and watering as required. In no case shall such maintenance be less than 3 weeks for watering and 6 weeks for remaining maintenance care.
 - 2. The maintenance of the sod shall include, regular mowing, one application of approved dry or liquid fertilizer to the sod guaranteed above. The fertilizer shall be applied and watered in as directed by the manufacturer. The time of fertilizing shall be approved.
 - 3. The Company shall be required under the maintenance of the guaranteed sod to safeguard and take all possible precautions against damage from the elements and other possible damage. The

Company shall be required to clean up the affected landscape area during the maintenance period due to any such event. The Company shall not be responsible to replace sod properly protected under this item of the specifications, damaged by the events beyond his control.

END OF SECTION

SECTION 02936

SEEDING AND MULCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The work consists of establishing a stand of grass on slopes, shoulders, lawns and other areas by seeding. Also included are mulching, fertilizing, watering and maintenance as required to produce a healthy stand of grass.

1.02 RELATED SECTIONS

- A. Section 02200 - Earthwork and Site Preparation
- B. Section 02221 - Trenching, Backfilling, and Compaction
- C. Section 02938 - Sodding

1.03 REFERENCES

A. Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

1.04 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging and location of packaging.

1.05 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Seed:

1. Grass seed shall be a mixture of 20 parts of Bermuda seed and 80 parts of Argentine Bahia. The separate types of seed used shall be thoroughly dry mixed immediately before sowing. Seed which has become wet shall not be used.
2. The Bermuda seed shall be an equal mixture of hulled and unhulled seed. The Argentine Bahia seed shall be scarified seed, having a minimum active germination of 40 percent and a total germination of 85 percent. All seed shall meet the requirements of the State Department of Agriculture and Consumer Services and all applicable state laws and shall be approved by the City Engineer before being sown.

B. Mulch:

1. Dry Mulch: The mulch material used shall normally be dry mulch. Dry mulch shall be straw or haw, consisting of oat, rye or wheat straw, or of pangola, peanut, coastal Bermuda or Bahia grass hay. Only undeteriorated mulch which can be readily cut into the soil shall be used.
2. Green Mulch: Green mulch shall consist of live coastal Bermuda, or other approved type of grass, and shall be free from weeds and obnoxious or undesirable grasses. No green mulch which, in the City Engineer's opinion, has been allowed to become sufficiently dry as to lose its growth producing benefits, will be allowed to be used. In the event that the subsequent stand of grass is found to be contaminated with weeds or other obnoxious or undesirable growth, and it can be determined that such growth was introduced with the green mulch, the Company will be required to effectively eliminate such undesirable growth at his own expense.
3. Wood Fiber Mulch:
 - a. Conwed Hydro Mulch Fibers.
 - b. Conwed Hydro Mulch 2000 Fibers.

C. Commercial Fertilizer:

1. Commercial fertilizers shall comply with the state fertilizer laws.
2. The numeral designations for fertilizer indicate the minimum percentages respectively of (1) total nitrogen, (2) available phosphoric acid and (3) water soluble potash, contained in the fertilizer.
3. The chemical designation of the fertilizer shall be 12-8-8. At least 50 percent of the phosphoric acid shall be from normal super phosphate or an equivalent source which will provide a minimum of two units of sulfur. The amount of sulfur shall be indicated on the quantitative analysis card attached to each bag or other container.

D. Water for Grassing: The water used in the grassing operations may be obtained from any approved spring, pond, lake, stream or municipal water system. The water shall be free of excess and harmful chemicals, acids, alkalies or any substance which might be harmful to plant growth or obnoxious to traffic. Salt water shall not be used.

2.02 EQUIPMENT

- A. Fertilizer Spreader: The device for spreading fertilizer shall be capable of uniformly distributing the material at the specified rate.
- B. Seed Spreader: The seed spreader shall be an approved mechanical hand spreader or other approved type of spreader.
- C. Equipment for Cutting Mulch into Soil: The mulching equipment shall be capable of cutting the specified materials uniformly into the soil and to the required controlled depth. Harrows will not be allowed.
- D. Rollers: A cultipacker, traffic roller, or other suitable equipment will be required for rolling the grassed areas.
- E. Hydraulic Mulcher: The mulch shall be mixed in standard hydraulic equipment to form a homogeneous slurry. The equipment shall be capable of spraying the slurry, under pressure, uniformly over the soil surface at the material application rate indicated. A continuous agitation system that keeps all materials in uniform suspension throughout the mixing and distribution cycles is required.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Preparation of Area to be Seeded: The ground to be seeded shall be prepared by disc harrowing and thoroughly pulverizing the soil to a depth of 4 inches. The prepared soil shall be loose and reasonably smooth. It shall be reasonably free of large clods, roots and other material which will interfere with the work and subsequent mowing and maintenance operations. Hand picking may be required.
- B. Soil Analysis: Before applying fertilizer, the soil pH shall be brought to a minimum range of 6.0 - 7.0.

3.02 APPLICATION

- A. General:
 - 1. Weather limitations: Fertilizing, seeding or mulching operations will not be permitted when wind velocities exceed 15 miles per hour. Seed shall be sown only when the soil is moist and in proper condition to induce growth. No seeding shall be done when the ground is unduly wet, or otherwise not in a tillable condition.
 - 2. Sequence of Operations: The several operations involved in the work shall proceed in the following sequence: Preparation and fertilizing of the ground, seeding, spreading of mulch, cutting-in of mulch and rolling.

B. Fertilizing:

1. The fertilizer shall be spread uniformly at the rate of 400 pounds per acre, by a spreading device capable of uniformly distributing the material at the specified rate. Immediately after spreading, the fertilizer shall be mixed with the soil to a depth of approximately 4 inches.
2. On steep slopes, where the use of a machine for spreading or mixing is not practicable, the fertilizer shall be spread by hand and raked in and thoroughly mixed with the soil to a depth of approximately 2 inches.
3. Where fertilizer is applied hydraulically, it need not be worked into the soil.

C. Seeding:

1. While the soil is still loose and moist, the seed shall be scattered uniformly over the grassing area at a rate of 100 pounds per acre.
2. When so directed by the City Engineer, seed of an approved quick growing species of grass, such as rye, Italian rye, millet or other cereal grass, shall be spread at a rate of 30 pounds per acre in conjunction with the permanent type seed mixture.
3. Seed may be applied hydraulically, but not in the mulch slurry.

D. Mulching:

1. Approximately 2 inches, loose thickness, of the mulch material shall be applied uniformly over the seed area, and the mulch material cut into the soil with the equipment specified, so as to produce a loose mulched thickness of 3 inches to 4 inches. Care shall be exercised that the materials are not cut too deeply into the soil.
2. When green mulch is used, it shall be incorporated into the soil not later than 2 days after being cut and no artificial watering of the mulch shall be done before it is applied.
3. On steep slopes, the mulch material shall be applied, and in lieu of being cut into the soil, shall be anchored down. Anchoring shall be done by either of the following methods:
 - a. Placing a layer of soil approximately 2 inches thick by 9 inches wide, along the upper limits of the mulch and spotting soil piles over the rest of the area at a maximum spacing of 4 feet.
 - b. Spreading a string net over the mulch, using stakes driven flush with the top of the mulch at 6 foot centers and stringing parallel and perpendicular with diagonals in both directions.

E. Rolling: Immediately after completion of the mulching, the entire seeded and mulched area shall be rolled thoroughly with the equipment specified. At least two trips over the entire area will be required.

F. Hydraulic Mulching: Wood fibre mulch shall be applied at the following rates:

1. Flat surfaces to 3 to 1 slopes 1,500 lbs. per acre.
2. Slopes steeper than 3 to 1 2,000 lbs. per acre.
3. Critical areas where designated 2,500 lbs. per acre.

G. Watering: The seeded areas shall be watered so as to provide optimum growth conditions for the establishment of the grass. In no case, however, shall the period of maintaining such moisture be less than 2 weeks after the planting.

H. Single Hydraulic Application: Using the standard hydraulic mulching equipment, the wood fiber mulch, seed and fertilizer may be applied as a combined slurry in a single application, provided that the seed is increased to the rate of 120 lbs. per acre and the fertilizer is increased to 450 lbs. per acre.

I. Maintenance:

1. The Company shall, at his expense, maintain the seeded areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include the repairing of any damaged areas where the establishment of the grass stand does not appear to be developing satisfactorily, or where erosion has washed away an area and filling and leveling are required.

2. Replanting or repair necessary due to the Company's negligence, carelessness or failure to provide routine maintenance shall be at the Company's expense.

END OF SECTION

SECTION 02938

SODDING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This specification provides a guide of items to be included and a detailed description is provided only for items of special manufacturer or type. The Company must examine the specifications carefully and include all items normally required for a complete and safe job. In general Design-Build Work includes, but is not limited to, the following major items:

1. Preparation of soil.
2. Fertilizing.
3. Sod installation.
4. Maintenance.

1.02 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Section 02950 - Trees, Plants and Ground Cover.

1.03 REFERENCES

- A. ASPA (American Sod Producers Association) - Guideline Specifications to Sodding.
- B. FS O-F-241 - Fertilizers, Mixed, Commercial.

1.04 DEFINITIONS

- A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy, Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorel, and Brome Grass.

1.05 SUBMITTALS

- A. Submit to the County Administrator with copy to City Engineer under provisions of Appendix 5 of the Service Contract.
- B. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer, and irrigation.
- D. Submit sod certification for grass species and location of sod source.
- E. Materials testing report.

1.06 QUALITY ASSURANCE

- A. Comply with Appendix 4 of the Service Contract requirements.
- B. Sod: Comply with American Sod Producers Association (ASPA) classes of sod materials.
- C. Provide and pay for materials testing. Testing agency shall be acceptable to the City Engineer. Provide the following data:
 - 1. Test representative materials samples proposed for use.
 - 2. Topsoil:
 - a. pH factor.
 - b. Mechanical analysis.
 - c. Percentage of organic content.

- d. Recommendations on type and quantity of additives required to establish satisfactory pH factor and supply of nutrients to bring nutrients to satisfactory level for planting.

D. Sod: Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.

1.07 QUALIFICATIONS

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Florida.

B. Installer: Company approved by the sod producer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.

B. Deliver sod on pallets. Protect exposed roots from dehydration.

C. Do not deliver more sod than can be laid within 24 hours.

D. Do not tear, stretch, or drop sod during handling and installation.

1.09 COORDINATION

A. Coordinate work under provisions of Section 01040.

1.10 MAINTENANCE SERVICE

A. Furnish service and maintenance of sodded areas until Final Completion.

1.11 PROJECT CONDITIONS

A. Work notification: Notify City Engineer at least 7 working days prior to start of sodding operations.

B. Protect existing utilities, paving, and other facilities from damage caused by sodding operations.

C. Perform sodding work only after planting and other work affecting ground surface has been completed.

D. Provide hose and lawn watering equipment as required.

1.12 WARRANTY

A. Provide a uniform stand of grass by watering, mowing, and maintaining lawn areas until final acceptance. Resod areas, with specified materials, which fail to provide a uniform stand of grass until all affected areas are accepted by the City Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Sod: Nursery grown pasture sod.
- B. Sod: An "approved" nursery grown sod composed of the specified grass species. Provide sod free of grassy or broadleaf weeds.
- C. Provide well-rooted, healthy sod, free of diseases, nematodes and soil borne insects. Provide sod uniform in color, leaf texture, density, and free of weeds, undesirable grasses, stones, roots, thatch, and extraneous materials; viable and capable of growth and development when planted.
 - 1. Furnish sod machine stripped and of Supplier's standard width, length, and thickness: Uniformly 1" to 1-1/2" thick with clean cut edges. Mow sod before stripping.
- D. Topsoil: As specified in Section 02950.
- E. Fertilizer:
 - 1. Granular, non-burning product composed of not less than 50% organic slow acting, guaranteed analysis professional fertilizer.
 - a. Type A: Starter fertilizer containing 20% nitrogen, 26% phosphoric acid, and 6% potash by weight or similar approved composition.
 - b. Apply Type A fertilizer at the rate equal to 1.0 lb. of actual nitrogen per 1,000 sq.ft. (220 lbs./acre). Apply fertilizer by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with the soil to a depth of 3" by dicing or other approved methods. Fertilize areas inaccessible to power equipment with hand tools and incorporate it into soil.
- F. Water: Free of substance harmful to sod growth. Hoses or other methods of transportation shall be furnished by Company.

2.02 ACCESSORIES

- A. Wood Pegs: Pressure treated, sufficient size and length to ensure anchorage of sod on slope.
- B. Edging: As specified.
- C. Herbicide: (Round-up).

2.03 HARVESTING SOD

- A. Machine cut sod and load on pallets in accordance with ASPA Guidelines.
- B. Cut sod in area not exceeding 12x18 inches with 1/2" topsoil base.

2.04 TESTS

- A. Provide analysis of topsoil.
- B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.
- C. Submit minimum 10 oz. sample of topsoil proposed. Forward sample to approved testing laboratory in sealed containers to prevent contamination.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that prepared soil base is ready to receive the Design-Build Work of this section.

3.02 PREPARATION OF SOIL

- A. Prepare sub-soil and eliminate uneven areas and low spots.
- B. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- C. Remove foreign materials and undesirable plants and their roots. Do not bury foreign material beneath areas to be sodded.
- D. Remove contaminated subsoil.
- E. Scarify sub-soil to a depth of 4 inches where topsoil is to be placed.
- F. Place topsoil.
- G. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.
- H. Dampen dry soil prior to sodding.
- I. Restore prepared areas to specified condition if eroded, settled, or otherwise distributed after fine grading and prior to sodding.

3.03 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.

- B. Apply after smooth raking of topsoil and prior to installation of sod.
- C. Apply fertilizer no more than 24 hours before laying sod.
- D. Mix thoroughly into upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.04 LAYING SOD

- A. Moisten prepared surface immediately prior to laying sod.
- B. Lay sod immediately after delivery to site within 24 hours after harvesting to prevent deterioration.
- C. Lay sod tight with no open joints visible, and no overlapping; stagger and joints 12 inches minimum. Do not stretch or overlap sod pieces.
- D. Lay smooth. Align with adjoining grass areas.
- E. Place top elevation of sod 1/2 Inch below adjoining edging paving curbs.
- F. On slopes 6 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.
- G. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.
- H. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.05 MAINTENANCE

- A. Maintain sodded lawns until completion and acceptance of the entire project by the City Engineer.
- B. Mow grass at regular intervals to maintain at a maximum height of 3 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- C. Neatly trim edges and hand clip where necessary.
- D. Immediately remove clippings after mowing and trimming.
- E. Water every 2 to 3 days to prevent grass and soil from drying out.
- F. Roll surface to remove all irregularities.
- G. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- H. Immediately replace sod in areas which show deterioration of bare spots.

3.06 ACCEPTANCE

A. Inspection to determine acceptance of sodded lawns will be made by the City Engineer, upon Company's request. Provide notification at least 10 working days before requested inspection date.

1. Sodded areas will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, even colored viable lawn is established, free of weeds, undesirable grass species, disease, and insects.

B. Upon acceptance, the City will assume lawn maintenance.

3.07 CLEANING

A. Perform cleaning during installation of the Design-Build Work and upon completion of the Design-Build Work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from sodding operations.

END OF SECTION

SECTION 02950

TREES, PLANTS AND GROUND COVER

PART 1 - GENERAL

1.01 DESCRIPTION

A. This specification provides a guide of items to be included and a detailed description is provided only for items of special manufacturer or type. The Company must examine the specifications carefully and include all items normally required for a job. In general Design-Build Work includes, but is not limited to, the following major items:

1. Preparation of subsoil and topsoil.
2. Topsoil bedding.
3. New relocation of trees, plants and ground cover.
4. Mulch and fertilizer.
5. Existing tree care.
6. Tree relocation.
7. Maintenance.

1.02 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Section 02938 - Sodding.

1.03 REFERENCES

- A. FS O-F-241 - Fertilizers, Mixed, Commercial.
- B. ANSI Z60.1 - Nursery Stock.
- C. Florida Grades and Standards for Nursery Plants.

1.04 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.
- B. Plants: Living trees, plants and ground cover specified in this Section and described in ANSI Z60.1.

1.05 MAINTENANCE DATA

- A. Maintenance Data: Include cutting and trimming method; types, application frequency, and recommended coverage of fertilizer; and Irrigation.

1.06 QUALITY ASSURANCE

A. Plant names indicated, comply with "Standardized Plant Names, 1942 Edition," as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature. Names of varieties not listed conform generally with names accepted by the nursery trade. Provide stock true to botanical name and legibly tagged.

B. Plant material shall be Florida No. 1 or better as outlined under Grades and Standards for the Nursery Plants, State Plant Board of Florida or as stated in the planting schedule. All plant material shall be nursery grown except where otherwise approved by the City Engineer. Plants shall have a habit of growth that is normal for the species and shall be of sound health, vigorous and free from insect pests, plant disease and injuries. Any tree or shrub with a weak, thin trunk not capable of supporting itself when planted will not be acceptable. All plants shall have been grown under climatic conditions similar to those in the locality of the project site for a minimum of two years. Inspections for required root system may be made upon delivery of plants to site.

C. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no additional cost, and providing that the larger plants will not be cut back to size indicated. Provide plants indicated by two measurements so that only a maximum of 25% are of the minimum size indicated and 75% are of the maximum size indicated.

D. Provide "specimen" plants with a special height, shape, or character of growth. Tag specimen trees or shrubs at the source of supply. The City Engineer will inspect specimen selections at the source of supply for suitability and adaptability to selected location.

E. Plants may be inspected and approved at the place of growth, for compliance with specification requirements for quality, size, and variety.

1. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the Design-Build Work.

F. Solid sod shall be sod of even thickness, of a firm or tough texture having a compact growth of grass with good root development in sandy soil and 99% free of noxious weeds. Sod shall be freshly cut within twenty-four (24) hours of laying.

G. Substitutions: Shall be permitted only upon approval by the City Engineer in accordance with Section 01600. If allowed, all requirements of plants specified shall be met.

1. Provide and pay for material testing if required. Testing agency shall be acceptable to the City Engineer. Provide the following data:

a. Test representative material samples proposed for use.

b. Topsoil:

1. pH factor.

2. Mechanical analysis.

3. Percentage of organic content.
4. Recommendations on type and quantity of additives required to establish satisfactory pH factor and supply of nutrients to bring nutrients to satisfactory level for planting.

1.07 QUALIFICATIONS

- A. Nursery: Company specializing in growing and cultivating the plants with five (5) years documented experience.
- B. Installer: Company specializing in installing and planting the plants with five (5) years documented experience approved by nursery.

1.08 PROJECT CONDITIONS

- A. Design-Build Work Notification: Notify City Engineer at least seven (7) working days prior to installation of plant material.

- B. Existing Conditions:

- 1. New Design-Build Work shall be tied to existing conditions and controls such as existing paving, existing trees, and controls and grades set on existing tree and hard surface plan, and existing natural grades surrounding project limits.
 - 2. The Company shall coordinate the installation of his Design-Build Work, i.e. installation of trees, irrigation lines, mains and/or laterals, landscape materials, etc. with all other Design-Build Work in such a manner that the landscape installations can progress in concert with overall site construction.
 - 3. A complete list of plants, including a schedule of sizes, quantities, and other requirements is shown on the drawings. In the event that quantity discrepancies or material omissions occur in the plant materials list, the planting plans shall govern.
 - 4. The irrigation system will be installed prior to planting. Locate, protect and maintain the irrigation system during planting operations. Repair irrigation system components damaged during planting operations at the Company's expense.

- C. Protection

- 1. All protection and methods of protection shall be at all times required to insure against damage to site Design-Build Work or the surrounding area.
 - 2. If any plants or other Design-Build Work are injured by Company's labor or equipment, they shall be replaced or treated as directed. Company is responsible for damage to plants or loss of plants from trespassers or vandalism and shall take measures to protect them during contract duration.
 - 3. Any damage caused to the property under this contract shall be immediately repaired or replaced to the satisfaction of the City.

4. The location of all existing underground utilities, including electric service shall be completely understood prior to any digging operations and any precautions necessary shall be attended to by Company in order not to damage existing utilities.

1.09 DELIVERY, STORAGE AND HANDLING

A. Deliver fertilizer materials in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. Store in manner to prevent wetting and deterioration.

B. Take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Spray deciduous plants in foliage with an approved "Anti-Desiccant" immediately after digging to prevent dehydration. Dig, pack, transport, and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival, the certificate shall be filed with the City Engineer.

C. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. Plants shall be lifted and handled from the bottom of the ball when possible. Trees moved by wrench or crane shall be thoroughly protected from chain marks, girdling or bark slippage by means of burlap, wood battens or other approved methods.

D. Plants moved with ball will not be accepted if the ball is cracked or broken before or during planting operations.

E. Sod shall be delivered to site on pallets in such quantity that it may be planted immediately and not stockpiled.

F. Insofar as it is practicable, plant material shall be planted on the day of delivery. In the event this is not possible, the Company shall fully protect and water the stock not planted.

G. Protect plants at all times from sun or drying winds. Plants that cannot be planted immediately on delivery shall be kept in the shade, well protected with soil, wet moss or other acceptable material, and shall not remain unplanted for longer than three (3) days after delivery. Water heeled-in plantings daily.

H. Cover plants transported on open vehicles with a protective covering to prevent wind burn.

I. Provide dry, loose topsoil for planting bed mixes. Frozen or muddy topsoil is not acceptable.

1.10 SUBMITTALS

A. Submit the following material samples:

1. Mulch.

2. Planting accessories.

- B. Submit the following materials certifications:
 - 1. Topsoil source and pH value
 - 2. Peat moss.
 - 3. Plant fertilizer.
- C. Submit material test results.
- D. Upon plant material acceptance, submit written maintenance instructions recommending procedures for maintenance of plant materials.
- E. Provide plant material record drawings:
 - 1. Legibly mark drawings to record actual construction.
 - 2. Indicate horizontal and vertical locations, referenced to permanent surface improvements.
 - 3. Identify field changes of dimension and detail and changes made by Change Order.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Do not install plant life when ambient temperatures may drop below 55 degrees F within 48 hours.
- B. Do not install plants when wind velocity exceeds 30 mph.

1.12 COORDINATION

- A. Coordinate Design-Build Work under provisions of Section 01040.

1.13 WARRANTY

- A. For a period of one (1) year from the date of Substantial Completion, the Company shall:
 - 1. Guarantee all plant material and trees supplied by him shall be alive, up-right and in satisfactory growth for each specific kind of plant at the end of the guarantee period.
 - 2. Guarantee of all Workmanship as specified under conditions of this Contract.
- B. Replace all plants that are dead or, as determined by the City Engineer, are in an unhealthy or unsightly conditions, and have lost their natural shape due to dead branches, or other causes due to the Company's negligence. The cost of such replacement(s) is at Company's expense. Warrant all replacement plants for one (1) year after installation.
 - 1. Replant with stock of same size and quality as originally specified.
 - 2. Guy as specified herein, at no extra cost.
- C. Warranty shall not include damage or loss of trees, plants, or ground covers caused by fires, floods, freezing rains, lightning storms, or winds over 75 mph, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism, after final completion.

1.14 MAINTENANCE SERVICE

- A. Maintain plant life immediately after placement (until plants are well established and exhibit a vigorous growing condition). Continue maintenance until termination of warranty period.
- B. Maintenance to include:
 - 1. Cultivation and weeding plant beds and tree pits.
 - 2. Applying herbicides for weed control in accordance with manufacturer's instructions. Remedy damage resulting from use of herbicides.
 - 3. Remedy damage from use of insecticides.

4. Irrigating sufficient to saturate root system.
5. Pruning, including removal of dead or broken branches, and treatment of pruned areas or other wounds.
6. Disease control.
7. Maintaining wrapping, guys, (turnbuckles), and stakes. (Adjust turnbuckles to deep guy wires tight). Repair or replace accessories when required.

PART 2 - PRODUCTS

2.01 TREES, PLANTS AND GROUND COVER

- A. Plants: Provide plants typical of their species or variety with normal, densely-developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sun-scald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, all forms of infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be rejected if they show signs of growth during storage.
- B. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock". Cracked or mushroomed balls are not acceptable.
- C. Container-grown stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.
 1. No plants shall be loose in the container.
 2. Container stock shall not be pot bound.

D. Provide tree species that mature at heights over 25'- 0" with a single main trunk. Trees that have the main trunk forming a "Y" shape are not acceptable.

E. Plants planted in rows shall be matched in form.

F. Plants larger than those specified in the plant list may be used when acceptable to the City Engineer. If the use of larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant.

G. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the plant list.

H. No pruning wounds shall be present with a diameter of more than 1" and such wounds must show vigorous bark on all edges.

I. Shrubs and small plants shall meet the requirements for spread and height indicated in the plant list.

1. The measurements for height shall be taken from the ground level to the average height of the top of the plant and not the longest branch.

2. Single stemmed or thin plants will not be accepted.

3. Side branches shall be generous, well-twiggged, and the plant as a whole well-bushed to the ground.

4. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other root or branch injuries.

2.02 SOIL MATERIALS

A. Topsoil for Planting Beds: Approximately 50% sand and 50% organic material, consisting of native peat, well-decomposed sawdust, leaf mold, and topsoil. It shall be fertile, friable, natural topsoil of loamy character, without admixture of subsoil material, obtained from a well-drained arable site, reasonably free from clay, lumps, coarse sands, stones, plants, roots, sticks, and other foreign materials, with acidity range of between pH 6.0 and 6.8.

1. Identify source location of topsoil proposed for use of the project.

2. Provide topsoil free of substances harmful to the plants which will be grown in the soil.

2.03 SOIL AMENDMENT MATERIALS

- A. Fertilizer: FS O-F-241, Type I II, Grade A B; with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated in analysis to the following proportions: Nitrogen 20% percent, phosphoric acid 26% percent, soluble potash 6% percent.
- B. Peat Moss: Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85% organic material measured by oven dry weight, pH range of 4 to 5; moisture content of 30%.
- C. Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.
- D. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.
- E. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of plants.
- F. Herbicide: Round-Up.

2.04 MULCH MATERIALS

- A. Mulch: Shredded melaleuca mulch, 100% organic, fibrous type. Furnish in 3 cu. ft. bags or bulk.

2.05 ACCESSORIES

- A. Stakes for Staking: Pressure Treated Pine, 2" x 2" x 8'-0" long.
- B. Staking Wire: No. 12 gauge 2 strand twisted galvanized wire encased in 1" diameter rubber hose.
 - 1. Turnbuckles: Galvanized steel of size and gage required to provide tensile strength equal to that of the wire. Turnbuckle openings shall be at least 3".

2.06 TESTS

- A. Provide analysis of imported/existing topsoil.
- B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt and organic matter and pH value.
- C. Submit minimum 10 oz. sample of topsoil proposed. Forward sample to testing laboratory in sealed containers to prevent contamination.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that prepared subsoil and planters are ready to receive Design-Build Work.
- B. Saturate soil with water to test drainage.
- C. Verify that required underground utilities are available, in proper location, and ready for use.

3.02 PREPARATION OF SUBSOIL

- A. Prepare soil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas (max. slope 4:1).
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.
- C. If obstructions are encountered that are not shown on the drawings, do not proceed with planting operations until alternate plant locations have been selected.
- D. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Scarify the bottom of the pit to a depth of 6". Remove excavated materials from the site.
- E. Provide pre-mixed ground cover bed planting mixture consisting of 3 parts planting topsoil to 1 part peat moss and 1/2 lb. plant fertilizer per cu. yd. Provide beds a minimum of 6" deep.

3.03 FERTILIZING

- A. Use Agriform 20-10-05 tablets on all trees and shrubs as per manufacturers' instructions.

3.04 PLANTING

- A. Set plant material in the planting pit to proper grade and alignment. Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure.
- B. After balled and burlapped plants are set, muddle planting soil mixture around bases of balls and fill all voids.
 - 1. Remove all burlap, ropes, and wires from the top 1/3 of balls.

C. Space plants as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 12" of the trunks of trees and shrubs within planting bed and to within 6" of edge of bed.

D. Mulching:

1. Mulch tree and shrub plantings pits and shrub beds with required mulching material 3" deep immediately after planting. Thoroughly water mulched areas. After watering, make mulch to provide a uniform finished surface.

2. Mulch ground cover beds with mulch 3" deep immediately after planting.

E. Staking:

1. Inspect trees for injury to trunks, evidence of insect infestation, and improper pruning.

2. Staking:

a. Stake all trees immediately after sodding operations and prior to acceptance. When high winds or other conditions which may affect tree survival or appearance occur, the City Engineer may require immediate staking.

3. All Design-Build Work shall be acceptable to the City Engineer.

F. Pruning:

1. Prune branches of deciduous stock, after planting, to balance the loss of roots and preserve the natural character appropriate to the particular plant requirements. In general, remove 1/4 to 1/3 of the leaf bearing buds, proportion shall in all cases be acceptable to the City Engineer. Remove or cut back broken, damaged, and unsymmetrical growth of new wood.

2. Multiple leader plants: Preserve the leader which will best promote the symmetry of the plant. Cut branches flush with the trunk or main branch, at a point beyond a lateral shoot or bud a distance of not less than 1/2 the diameter of the supporting branch. Make cut on an angle.

3. Prune evergreens only to remove broken or damaged branches.

G. Saturate soil with water when the pit or bed is half full of top soil and again when full.

3.05 CARE OF EXISTING TREES

A. Selectively prune existing trees in designated areas, under City Engineer's direction. Remove sucker shoots, dead, rubbing, and damaged branching.

B. Fertilize designated existing trees with 2 to 3 lbs. of plant fertilizer per inch of trunk diameter, for trees less than 6" diameter and 3 to 5 lbs. for trees greater than 6" diameter.

1. Fertilize in early spring before growth begins or in late October.

2. Fertilize at 2' to 3' on center in a triangular pattern to a depth of 18" within the drilling.
3. Injection or drilling fertilization methods, when used, shall be acceptable subject to City Engineer's approval.
- C. Water existing trees every 2 weeks until acceptance. Water thoroughly with a fine mist sprinkler head, soaker hose, or hose at a low flow rate over the entire drip line area as required to allow water to penetrate to a depth of 12" to 18".

3.06 PLANT SUPPORT

- A. Brace plants vertically with plant protector wrapped guy wires and stakes.

3.07 FIELD QUALITY CONTROL

- A. Field inspection will be performed.
- B. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.08 MAINTENANCE

- A. Maintain plantings until completion and acceptance of entire project.
- B. Maintenance shall include pruning, cultivating, weeding, watering, and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.
 - 1. Re-set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
 - 2. Tighten and repair guy wires and stakes as required.
 - 3. Correct defective Design-Build Work as soon as possible after deficiencies become apparent and weather and season permit.
 - 4. Water trees, plants, and ground cover beds within the first 24 hours of initial planting, and not less than twice per week until final acceptance.

3.09 ACCEPTANCE

- A. Inspection to determine acceptance of planted areas will be made by the City Engineer, upon Company's request. Provide notification at least 5 working days before requested inspection date.
 - 1. Planted areas will be accepted provided all requirements, including maintenance, have been complied with and plant materials are alive and in a healthy, vigorous condition.

3.10 CLEANING

- A. Perform cleaning during installation of the Design-Build Work and upon completion of the Design-Build Work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from planting operations.

END OF SECTION

SECTION 03301

CONCRETE AND REINFORCING

PART 1 - GENERAL

1.01 SCOPE

A. Company shall furnish all labor, materials, equipment and incidentals needed to provide formwork, reinforcement, and concrete including all concrete joints, grout and incidentals required to complete the Design-Build Work as shown and specified.

B. Work Included in This Section. Principal items are:

1. Concrete footings, foundations, and structures.
2. Floor slabs.
3. Concrete Paving for handicap parking space.
4. Building Perimeter Sidewalks.
5. Openings in concrete to accommodate the Design-Build Work under this and other Sections.
6. Embedded items such as sleeves, frames, anchor bolts, inserts and other items.

C. Related Design-Build Work Specified in Other Sections:

1. Section 02200 - Earthwork and Site Preparation.
2. Section 05500 - Miscellaneous Metals.

D. Concrete having a 28 day compressive strength of 4,000 psi shall be used for the following:

1. Foundations and structures.
2. Structural slabs on grade.
3. Equipment Pads.

E. Concrete having a 28 day compressive strength of 3,000 psi shall be used for the following:

1. Sidewalks.
2. Curbs.
3. Handicap Pavement.

4. Thrust blocking.
5. Pipe stand footings.
6. Valve collars.
7. Bollard footings and fill.
8. Masonry Bond Beams and Lintels.

1.02 QUALITY ASSURANCE AND REFERENCE SPECIFICATIONS

- A. ACI 301, Specifications For Structural Concrete For Buildings, latest edition. The Company shall maintain copy at site during Design-Build Work.
- B. ACI 347, Recommended Practice For Concrete Formwork.
- C. ACI 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures.
- D. CRSI "Placing Reinforcing Bars".
- E. Test results of proposed concrete mixes shall comply with ACI 301, Chapter 3.
- F. All field and laboratory sampling and testing shall be performed by an independent testing laboratory with all costs paid by the Company.

1.03 SUBMITTALS

- A. The Company shall provide submittals in accordance with requirements of Appendix 5 of the Service Contract. In addition, submit the following to the City Engineer for approval:
 1. Shop drawings of reinforcement.
 2. Concrete mix designs.
 3. Manufacturer's certificates for admixtures.
 4. Certified copies of required tests.
 5. Joint location drawings.

PART 2 -PRODUCTS

2.01 MATERIALS

- A. Forms. Company's choice of materials of grade or type suitable to obtain specified finish.
- B. Concrete. Materials shall comply with ACI 301, Chapter 2. Admixtures containing calcium chloride are not allowed.
 - 1. ASTM C 150, Type I cement for 4,000 psi and 3,000 psi concrete.
- C. Reinforcement: Materials shall comply with ACI 301, Chapter 5 and shall be of the size as shown on the DRAWINGS.
 - 1. Reinforcing bars and doweling shall conform with ASTM A 615, Grade 60.
 - 2. Welded wire fabric shall conform with ASTM A 185 and be in flat sheets, not rolls.
- D. Water stops: Preformed, single component, self sealing waterstop shall meet or exceed all requirements of Federal Specification SS-S-210A.
 - 1. SYNKO-FLEX primer and SYNKO-FLEX waterstop as manufactured by SYNKO-FLEX Products, Inc., or approved equal.
- E. Expansion joint filler: Type I, preformed sponge neoprene expansion joint filler conforming to AASHTO Designation M-153.
- F. Joint sealer:
 - 1. Horizontal joints: Sikaflex 2C Self Leveling, by Sika Corp., or approved equal.
 - 2. Vertical joints: Sikaflex 2C Non-Sag, by Sika Corp., or approved equal.
- G. Curing compound shall conform to ASTM C 309.
- H. Floor hardener: Cure-Hard by W. R. Meadows, Inc., or approved equal.
- I. Nonslip Finish: Fused aluminum oxide grits with emery aggregate containing not less than 40 percent aluminum oxide and not less than 25 percent ferric oxide. Material shall be factory-graded, packed, rust-proof and non-glazing, and is unaffected by freezing, moisture and cleaning materials, by B/C Nonslip Aluminum Oxide, Admixtures, Inc., or equal.
- J. Grout shall be as specified in Section 03600.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Formwork:
 - 1. Comply with ACI 301, Chapter 4 - Formwork.

2. Finish: Comply with ACI 301, Article 10.4 except as specified elsewhere.
- B. Placing of reinforcing bars:
 1. Comply with applicable recommendations of CRSI "Placing Reinforcing Bars", and ACI 315.
 2. Concrete shall not be placed until the reinforcing steel is inspected and permission for placing concrete is granted by the City Engineer.
- C. Concrete joints: Place construction and expansion joints where shown on the drawings.
 1. Joints shall not be added or relocated without approval of City Engineer.
 2. Construction joints in slabs will be permitted only at 1/4 of the clear span between supports or column lines.
 3. Waterstops shall be continuous with jointing as recommended by manufacturer.
- D. Place embedded items in accordance with ACI 301, Chapter 6.
- E. Place concrete in accordance with ACI 301, Chapter 8.
- F. Slump of concrete shall be 4-inches, or less as determined by ASTM C 143.
- G. Tolerances: Comply with ACI 301, Chapter 4 for formed surfaces, and ACI 301, Article 11.9, Class B for slabs.
- H. Surfaces to be grouted shall be cured, cleaned, damped and roughened per grout manufacturer's recommendations to provide bonding of grout.
- I. Finishing of formed surfaces shall conform with ACI 301, Chapter 10.
 1. Rough formed surfaces shall used on all vertical surfaces up to 1-foot below finish grade not receiving a coating such as waterproofing, dampproofing, paint or other similar coating.
 2. Smooth formed surfaces shall be used on all vertical surfaces that are to be covered with a coating material.
 3. Smooth rubbed finish shall be used on all exterior exposed vertical surfaces down to 1-foot below grade and on all interior exposed vertical surfaces.

- J. Finish of slabs shall conform with ACI 301, Chapter 11.
- 1. Troweled Finish shall be used on all interior slabs.
- 2. Broom finish shall be used on all exterior slabs and sidewalks.
- K. Cure and protect concrete in accordance with ACI 301, Chapter 12.
- L. Concrete coatings shall be as specified in Section 09905.

3.02 FIELD QUALITY CONTROL

A. The Company shall pay for an independent testing laboratory to perform sampling and testing during the placement of concrete as follows:

- 1. Sampling fresh concrete: ASTM C 172.
- 2. Compressive strength tests: ASTM C 39. Four sample compression cylinders for over 5CY and 20-25CY thereafter, or fraction thereof, of each mix design placed in any one day. Test one specimen at 3 and 7 days, and two specimens at 28 days.
 - a. Concrete which does not meet strength requirements is subject to rejection and removal from the Design-Build Work, or to other such corrective measures as determined by the City Engineer, at no cost to the City.
- 3. Slump: ASTM C 143, one for each set of compression cylinder cast.
- 4. Air content: ASTM C 231. One test for each set of compression cylinder cast.
- 5. The testing laboratory will submit certified copies of test results to the City Engineer and the Company within 24 hours after tests are made.
- 6. Company shall assist testing laboratory personnel as required for providing access to the Design-Build Work and collecting samples.

END OF SECTION

SECTION 03400
PRECAST CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide precast concrete drainage structures, manholes, junction boxes, and other precast concrete items as specified herein.
- B. Design-Build Work Included in this Section:
 - 1. Storm drainage and surface water management structures.
 - 2. Floor drainage retention structure, manholes, pullboxes.
- C. Related Design-Build Work Not Included in This Section:
 - 1. Trenching, Backfilling, and Compaction, Section 02221.
 - 2. Piping and Appurtenances, Section 15060.
 - 3. Joint Sealant, Section 07920.
 - 4. Concrete and Reinforcing, Section 03301.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with Appendix 5 of the Service Contract and to include, but not be limited to, the following:
 - 1. Shop drawings for review showing wall thickness, reinforcing, and the location and diameter of all penetrations.
 - 2. Shop drawings showing the dimensions, weights and other details for all castings, grates, frames, and covers.
 - 3. Detailed fabrication drawings. Fabrication of members shall not proceed until shop drawings and calculations are approved by the City engineer. Designs submitted shall be signed and sealed by an engineer duly registered in the State of Florida. Shop drawings shall include, but not be limited to, design loads, fabrication details, flotation computations as needed, and member identification marks. Identification markers shall appear on manufactured units to facilitate correct field placement.
 - 4. Inserts, hangers, pipe sleeves, and block-outs required by various trades or as indicated on the drawings shall be located and detailed on the shop drawings. Such items shall be cast as detailed. Omissions or changes in location or details by the Company or the various trades shall be done at the expense of the Company.

1.03 QUALITY ASSURANCE

- A. Manufacturers of precast items shall submit evidence indicating a minimum of 5 years experience in the design and fabrication of the type of item being submitted.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Precast concrete structures shall be in accordance with the requirements of ASTM C478 and Sections 425-3 and 425-5 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition. Precast concrete structures shall be cast using Type II cement and flyash conforming to the requirements of ASTM C618, Class F. Concrete shall conform to the requirements of Section 03301, "Concrete and Reinforcing". Structure types shall be in accordance with FDOT Standard Index Drawings.
- B. Castings for frames and gratings shall conform to the requirements of Section 05500 of these specifications.
- C. Sealing compound for precast concrete manholes and stormwater structures shall be rubber rings.
- D. Pipe connections to manholes and floor drainage retention structure shall be made using a flexible connector equal to Kor-N-Seal as manufactured by NPC Systems, Inc., Milford, NH.
- E. Pipe connections to drainage structures shall be made with neat Type II portland cement grout.
- F. Interior and exterior coatings for manholes and floor drainage retention structure shall be as specified in Section 09905. Stormwater drainage structures are to be uncoated.

PART 3 - EXECUTION

3.01 PRECAST CONCRETE STRUCTURES

- A. Excavation and backfill shall conform to the requirements of Section 02221.
- B. Precast concrete units shall be installed at the grade and alignment shown on the drawings.
- C. After installation all precast units and the connecting piping shall be flushed and all silt, dirt, trash, and debris removed and the completed system left in a clean condition ready for operation.

END OF SECTION

SECTION 03600

GROUT

PART 1 - GENERAL

1.01 SCOPE

A. Company shall furnish all labor, materials, equipment, and incidentals required to provide grout as shown and specified.

B. Grout shall be placed at the following locations:

1. Doweling.
2. Concrete Joints.
3. Concrete Patchwork.
4. Anchor Bolts.
5. Waterstops.
6. Under baseplates.

C. The types of grout include the following:

1. Non-shrink, epoxy type.
2. Non-shrink, non-metallic type.
3. Ordinary cement-sand.

D. Related WORK Specified Elsewhere:

1. Concrete and Reinforcing, Section 03301.
2. Structural Steel, Section 05120.

1.02 SUBMITTALS

A. Shop Drawings. The Company shall submit shop drawings in accordance with Appendix 5 of the Service Contract and as contained herein:

1. Submit copies of manufacturer's specifications and installation instructions for all proprietary materials.

B. Reports and Certificates:

1. For proprietary materials, submit copies of reports on quality control tests.

2. For nonproprietary materials, submit certification that materials meet specification requirements.

1.03 QUALITY ASSURANCE

A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ASTM C 150, Portland Cement.
2. ASTM C 109, Compressive Strength of Hydraulic Cement Mortars (using 2-in. or 50 mm. Cube Specimens).
3. ASTM C 191, Time of Setting of Hydraulic Cement by Vicat Needle.
4. CRD-C 588, Specifications for Non-Shrink Grout.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials: Grout materials from manufacturers shall be delivered in unopened containers and shall bear intact manufacturer's labels.

B. Storage of Materials: Grout materials shall be stored in a dry shelter and shall be protected from moisture.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Non-metallic, cartridge style, 100 percent solids, high strength epoxy grout.

1. Product and Manufacturer: Speed Bond #1 as manufactured by Prime Resins Inc.
2. Or Equal.

B. Non-Shrink, Non-Metallic Grout:

1. Pre-mixed non-staining cementitious grout requiring only the addition of water at the job site meeting ASTM C-827 and CRD C-621.
2. Product and Manufacturer:
 - a. Sikagrout 212 by Sika Corp.
 - b. Masterflow 713 by Master Builders Company.
 - c. Non-Ferrous Non-Shrink Grout by the Burke Company.
 - d. Non-Shrink, Non Metallic Grout as manufactured by W.R. Meadows.

e. Or Equal.

C. Ordinary Cement-Sand Grout:

1. Except where otherwise specified use 1 part cement to 3 parts sand complying with the following:

a. Cement: ASTM C 150, Type I.

b. Sand: ASTM C 33.

2. For water repelling and shrinkage reducing requirements use admixtures.

a. Product and Manufacturer:

1. Integral Waterpeller by The Euclid Chemical Company.

2. Omicron, Type OM by Master Builders Company.

3. Hydrocide Powder by Sonneborn-Contech.

4. Or Equal.

D. Water:

1. Use clean, fresh, potable water free from injurious amounts of oils, acids, alkalies or organic matter.

E. Epoxy Resin Adhesive:

1. Two part mix 1:1

2. Manufacturer: Sika Corp - Sikadur 32, Hi-Mod (Horizontal joints), Sikadur 31 Hi-Modgel (Vertical joints) or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General:

1. Place grout as shown and in accordance with manufacturer's instructions. If manufacturer's instructions conflict with the specifications do not proceed until City Engineer provides clarification.

2. Drypacking will not be permitted unless approved by the City Engineer.

3. Placing grout shall conform to temperature and weather limitations of concrete placement as specified in Section 03301.

4. Surface to be grouted is to be adequately cured, cleaned dampened and roughened per manufacturer recommendations to insure adequate bonding.

B. Grout for Doweling and Anchor Bolts:

1. Non-metallic high strength epoxy grout shall be introduced at the bottom of the drill holes using a caulking tube or other injection means. The hole shall be blown out at 150 psi prior to the introduction of grout into the hole. Care shall be taken to adequately fill the hole with grout before the dowel or anchor rod is inserted, to insure complete contact with the anchor for its full length.

2. A plug shall be placed in the top of the hole to hold the bars securely until the grout sets. Special care shall be taken to insure against any movement of the bars which have been placed.

3. Epoxy resin Adhesive shall be used in accordance with manufacturer's recommended application.

C. Grouting for Equipment:

1. Use non-shrink, non-metallic grout for setting equipment. Provide a minimum grout thickness of 1 inch.

D. Place a 4-6 inch layer of sand cement grout at the base of walls before placing concrete in forms.

E. Patchwork:

1. Furnish and install non-shrink, non-metallic grout for dry packing as required to patch all miscellaneous penetrations. Prepare surface and place grout as recommended by manufacturer and as specified. Finish grout off flush with existing surface.

2. Reinforce with approved wire mesh and use approved structural concrete for penetrations larger than 1/2 square feet.

END OF SECTION

SECTION 04810 - UNIT MASONRY ASSEMBLIES**1.1 SUMMARY****A. Masonry Construction:**

1. Single-wythe masonry.
2. Composite masonry.
3. Masonry veneer.
4. Installation of cast stone trim.

1.2 PERFORMANCE REQUIREMENTS

- A. Net-Area Compressive Strengths (f_m) of Structural Unit Masonry shall be a minimum of 1,500 psi.

1.3 QUALITY ASSURANCE

- A. Preconstruction Testing Service: Owner engaged, with payment from Testing and Inspecting Allowance.
- B. Mockups of typical wall areas.

1.4 MATERIALS**A. Concrete Masonry Units (CMUs):**

1. Units made with integral water repellent for exposed units and where indicated.
2. Concrete Masonry Units: Normal-weight.
3. Decorative Concrete Masonry Units: Normal-weight units with split-face, split-ribbed finish.

- B. Concrete Lintels: Precast units matching CMU, 5,000 psi concrete as specified in Section 03301.

- C. Reinforcing Steel: Uncoated steel bars.

D. Masonry Joint Reinforcement:

1. Interior Walls: Hot-dip galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.

E. Ties and Anchors: Galvanized steel.

1. Corrugated metal ties.
2. Individual wire ties.
3. Adjustable anchors for connecting to structure.

4. Partition top anchors.
5. Rigid anchors.
6. Stone Anchors: Galvanized steel
7. Adjustable Masonry-Veneer Anchors: Slip-in.

F. Embedded Flashing:

1. All Flashing: Stainless steel.
2. Partially Exposed Flashing: Stainless steel.
3. Concealed (Flexible) Flashing: Rubberized asphalt, elastomeric thermoplastic or EPDM.
 - a. Used with stainless-steel, drip edges, flashing terminations.
4. Single-Wythe CMU Flashing System: High-density polyethylene cell flashing pans and interlocking CMU web covers.

G. Weep/Vent Holes: Open head joints

H. Cavity drainage material.

I. Reinforcing bar positioners.

J. Masonry-Cell Insulation:

K. Cavity-Wall Insulation: Polyisocyanurate board.

L. Mortar: Colored aggregate.

1.5 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner engaged, with payment from Testing and Inspecting Allowance.

1.6 INSTALLATION

- A. Bond Pattern: Running bond.
- B. Clean masonry waste recycled as fill material.

1.7 FIELD QUALITY CONTROL

- A. Testing Agency: Owner engaged, with payment [from Testing and Inspecting Allowance.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 04810

SECTION 05120
STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SCOPE

- A. This section covers the work necessary to furnish and install, complete, the structural steel, and shall include all metal parts required for permanent connection of the structural steel.
- B. Like items of materials provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, maintenance, and replacement.
- C. Related Design-Build Work Specified Elsewhere:
 - 1. Grout, Section 03600.
 - 2. Miscellaneous Metals, Section 05500.
 - 3. Painting and Protective Coatings, Section 09905.

1.02 SUBMITTALS

- A. Submittals during construction shall be made in accordance with Appendix 5 of the Service Contract.
- B. Shop Drawings, complete with all information and sections.
- C. Prime coating certification.

1.03 QUALITY ASSURANCE

- A. Reference Standards: Comply with the current provisions of the following, except as otherwise indicated:
 - 1. AISC "Code of Standard Practice for Steel Buildings and Bridges"
 - 2. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings" and including the "Commentary of the AISC Specification"
 - 3. AISC "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts" approved by the Research Council on Structural Connections of the Engineering Foundation, August 14, 1985; endorsed by the American Institute of Steel Construction and the Industrial Fasteners Institute
 - 4. AWS Structural Welding Code AWS D1.1 and "Standard Qualification Procedure"
 - 5. ASTM A 36/A 36M, Structural Steel

6. ASTM A 53, Pipe, Steel, Black and Hot-Dipped, Zinc Coated Welded and Seamless
7. ASTM A 325, High Strength Bolts for Structural Steel Joints (Rev. C)
8. ASTM A 490, Heat-Treated Steel Structural bolts, 150 ksi Minimum Tensile Strength (Rev. A)
9. ASTM A 500, Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes (Rev. A)
10. ASTM A 501, Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
11. AWS D1.1, Structural Welding Code - Steel

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Load structural members in such a manner that they may be transported and unloaded without being excessively stressed, deformed, and otherwise damaged.

B. Material Storage:

1. Protect structural steel members and packaged materials from corrosion deterioration. Material shall be stored in a dry area and shall not be placed in direct contact with the ground.
2. Do not place materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Rolled Plates, Shapes, and Bsns: ASTM A 36 unless otherwise shown on the drawings.
- B. Structural Steel Pipe: ASTM A 501, or ASTM A 53, Type E or S, Grade B.
- C. Structural Tubing: ASTM A 501, or A 500, Grade B. All members shall be furnished full length without splices unless otherwise noted or approved.
- D. Bolts for Connections: ASTM A 325 zinc-coated, unless otherwise shown.
- E. Welded Studs: Welded anchor studs shall be headed concrete anchor studs (HAS), or deformed bar anchors (DBA), or threaded anchor studs (TAS), and as supplied by Nelson Stud Welding Company, Lorain, OH; Omark Industries, KSM Fastening Systems Division, Seattle, WA, or Portland, OR, or equal.
- F. Shop Paint Primer: Structural steel shall be cleaned and coated with shop paint primer. Surface preparation and primer shall be as specified in Division 9 - Finishes. Shop prime coat shall be applied within eight hours after surface preparation.

PART 3 - EXECUTION

3.01 WORKMANSHIP

- A. Measurement: The Company shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of Design-Build Work. The Company shall review the drawings and any discrepancies shall be reported to the City Engineer for clarification prior to starting fabrication.
- B. Shop Drawings: Shop drawings shall conform to AISC recommendations and Specifications and shall show all holes, etc., required for other Design-Build Work. Include complete details showing all members and their connections, anchor bolt layouts, schedules for fabrication procedures, and diagrams showing the sequence of erection.

3.02 FABRICATION

- A. General
 - 1. Fabricate items of structural steel in accordance with the DRAWINGS, AISC Specifications, and as indicated on the final reviewed shop drawings.
 - 2. Properly mark and matchmark materials for field assembly.
 - 3. Where finishing is required, complete the assembly, including bolting and welding of units, before start of finishing operations.

B. Connections: Weld or bolt shop connections. Bolt field connections, except where welded connections or other connections are shown or specified. All connections unless shown otherwise shall develop full strength of members joined and shall conform to AISC standard connections.

C. Welded Construction:

1. Comply with AWS Current D1.1 Code for procedures, appearance, and quality of welds and welders, and methods used in correcting welding work.

2. Submit welder certifications for shop and field welders in triplicate, directly to the City Engineer from a recognized testing laboratory, with copies to the Company and others as required.

3. Unless otherwise shown, all butt welds are complete penetration.

D. Holes for Other Work: Provide holes as necessary or as indicated for securing other work to structural steel framing, and for the passage of other work through steel framing members. Provide threaded nuts welded to framing, and other specialty items to receive other work. Torch cut holes are not permitted.

E. Shop Paint Primer: Apply shop paint primer in accordance with Division 9 - Finishes. Omit at welds, bolts, and where embedded in concrete. Remove all slag from welds before painting.

F. Inspection: Shop inspection may be required by the City at his own expense (except for weld inspection as mentioned herein). The Company shall give ample notice to the City Engineer prior to the beginning of any fabrication work so that inspection may be provided. The Company shall furnish all facilities for the inspection of materials and workmanship in the shop and inspectors shall be allowed free access to the necessary parts of the Design-Build Work. Inspectors shall have the authority to reject any materials or Design-Build Work which does not meet the requirements of these specifications. Inspection at the shop is intended as a means of facilitating the Design-Build Work and avoiding errors, but it is expressly understood that it will in no way relieve the Company from his responsibility for furnishing proper materials or workmanship under these specifications.

3.03 ERECTION

A. General: Comply with the AISC Specifications and Code of Standard Practice, and with specified requirements.

B. Anchor Bolts:

1. Furnish anchor bolts and other connectors required for securing structural steel to in-place work.

2. Furnish templates and other devices for presetting bolts and other anchors to accurate locations.

C. Setting Bases and Bearing Plates:

1. Clean concrete surfaces of bond reducing materials and roughen to improve bond to surfaces. Clean the bottom surface of base and bearing plates.
2. Set loose and attached baseplates and bearing plates for structural members on wedges, leveling nuts, or other adjustable devices.
3. Tighten the anchor bolts after the supported members have been positioned and plumbed.
4. Grouting of baseplates shall be as specified in Section 03600 - Grout. Grout prior to placing loads on structure.

3.04 FIELD ASSEMBLY

- A. Set structural frames accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
- B. Level and plumb individual members of the structure within specified AISC tolerances. Company shall provide and install all temporary bracing required until structure is complete.
- C. Establish required leveling and plumbing measurements on the mean operating temperature of the structure.

3.05 MISFITS AT BOLTED CONNECTIONS

- A. Where misfits in erection bolting are encountered, the City Engineer shall be immediately notified and shall select an industry acceptable method to remedy such as:
 1. Ream holes that must be enlarged to admit bolts and use oversized bolts.
 2. Plug weld misaligned holes and redrill holes to admit standard size bolts.
 3. Drill additional holes in the connection, conforming with AISC Standards for bolt spacing, and end and edge distances and add additional bolts.
 4. Reject the member containing the misfit, mis-sized, or misaligned holes and fabricate a new member to ensure proper fit.
- B. Mis-sized or misaligned holes in members shall not be enlarged by burning or by the use of drift pins.

3.06 MISFITS AT ANCHOR BOLTS

- A. Any misalignment between anchor bolts and bolt holes in steel members shall be resolved by submitting a request to the City Engineer for review. The request shall show an industry

acceptable method to remedy the misalignment. Flame cutting to enlarge holes shall not be acceptable.

3.07 GAS CUTTING

A. Do not use gas cutting torches in the field for correcting fabrication errors in the structural framing, except on secondary members which are not under stress and will be concealed in the finished structure and when approved by the City Engineer. Finish gas-cut sections equal to a sheared appearance.

3.08 TOUCHUP PAINTING

A. Immediately after erection, clean field welds, bolted connections, and abraded areas of the shop paint primer. Apply touchup paint primer by brush or spray which is the same thickness and material as that used for the shop coat.

3.09 QUALITY CONTROL TESTING

A. The City Engineer may engage inspectors to inspect bolted connections and welded connections and to perform tests and prepare test reports.

B. Weld Inspection:

1. All butt welds shall be 100 percent tested in accordance with AWS D1.1, Part B, Radiographic Testing of Welds.

2. The examination, report, and disposition of radiographs shall be in accordance with Section 6.12 of AWS D1.1. All reports shall be submitted to the City Engineer for review prior to completion of the work in this section.

3. Welds that are required by the City Engineer to be corrected shall be corrected or redone and retested as directed, at the Company's expense and to the satisfaction of the City Engineer and/or approved independent testing lab.

C. Finish Painting:

1. Finish painting of all exposed structural steel shall be as specified in Division 9 -Finishes.

END OF SECTION

SECTION 05500

MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide miscellaneous metal work as indicated, specified, and required. This specification provides a guide of items to be included and detailed description is provided only for items of special manufacture or type. The Company must examine drawings carefully and include all items normally required for a complete and safe job. Workmanship shall be best quality and in compliance with best practices. In general, Design-Build Work includes, but is not limited to, the following major items:

1. Anchors, shelf angles, seat angles and miscellaneous bars, clips and channels.
2. Construction castings such as trench drains, covers and frames, manhole covers and frames, bollards, posts, and pipe sleeves or castings.
3. Aluminum plate.
4. Platform grating, handrails and kickplate.
5. Shop painting of miscellaneous ferrous metals.
6. Miscellaneous connections, anchors, bolts, clips, spacers, nuts, washers, shapes and inserts, as required.
7. Miscellaneous iron and steel items indicated, specified, or required for completion of the Service Contract, unless included under other Sections of the Specification.
8. Galvanizing, shop primer finishes for work of this Section as specified or required, including field touch ups of same.

B. Related Design-Build Work Specified Elsewhere.

1. Section 03301 - Concrete and Reinforcing.
2. Section 05120 - Structural Steel.

1.02 SUBMITTALS

- A. Shop/Erection Drawings. Prior to purchase or fabrication, submit shop drawings and erection drawings for approval in accordance with the requirements of Appendix 5 of the Service Contract. Provide complete details of fabrication, assembly, and erection including at a minimum; sizes of all members, fastenings, supports and anchors, patterns, clearances, and all necessary connections to work of other trades.
- B. Test Reports. Submit copies of certified test reports for physical and chemical mill properties and conformance with applicable Federal and ASTM specifications, prepared by an independent testing laboratory.
- C. Shop Painting Data. In coordinated manner with requirements for Painting and Protective Coatings specified in Division 9, Company shall submit product list with product data sheets of intended shop coats which for compatibility shall be the same products and manufacturer as those of deferred field-applied systems intended to be used in Design-Build Work of Division 9.

1.03 VERIFICATION OF CONDITIONS

- A. Verify site conditions which will affect Design-Build Work of this Section, and obtain accurate dimensions. Report to the City Engineer discrepancies between drawings and field dimensions prior to commencing Design-Build Work.
- B. Proceeding with fabrication or installation of miscellaneous metal items will be construed as evidence of acceptance by the Company of conditions under which miscellaneous metal work will be done.

1.04 COMPLIANCE WITH STANDARD AND INDUSTRY SPECIFICATIONS

- A. Any material or operation specified by reference to the published Specifications of a manufacturer, and published industry standards applicable to the work in this Section, shall comply with the requirements of the current specification or standard listed. In case of a conflict between the referenced Specification and the Project specifications, the latter shall govern, unless written approval is obtained from the City Engineer.

1.05 PROTECTION

- A. Handle miscellaneous metal items to avoid injury to persons and to avoid damage to materials or to work in place. Promptly repair or remove and replace work that has been damaged.

1.06 DELIVERY AND STORAGE

- A. Deliver packaged materials to site in manufacturer's original, unopened containers. Arrange deliveries to provide sufficient quantities to permit continuity of erecting for any phase of Design-Build Work.

B. Store to prevent damage to materials or structure. Store ferrous metals to prevent rusting. Cover or encase finished surfaces to avoid scratching or discoloration.

PART 2 - PRODUCTS

2.01 GENERAL

A. Steel. Rolled shapes, plates, and bars shall conform to the latest edition of the AISC "Manual of Steel Construction" and shall also conform to current ASTM Designation A 36.

1. Stainless Steel. Unless otherwise designated or approved, use stainless steel alloy types as follows which conform to ASTM A-167 and ASTM A-276:

a. Stainless steel plates and bars shall be AISI Type 316 or Type 317 unless otherwise noted.

b. Stainless steel anchor bolts shall be AISI Type 316.

c. Stainless steel bolts, nuts and washers shall be AISI Type 316 where connecting or bearing on aluminum.

2. Pipe. Conform to ASTM A 53, Grade B seamless galvanized as required, Schedule 40 except as otherwise shown on drawings.

B. Cast Iron. Conform to ASTM A-48, Class 35B except as otherwise designated.

C. Ductile Iron. Conform to ASTM A 536 using grade 65-45-12 or better, except as specifically designated otherwise.

D. Aluminum. All aluminum plate, pipe and structural shapes shall be new and shall conform to applicable Federal Specification for 6061-T6 alloy, unless otherwise noted. Mill-finish aluminum pipe of sizes designated shall be Schedule 40 or greater weight if required.

E. Checkered Plate. Conform to Federal Specification QQ-F461 and use thickness not less than that shown on the drawings. Raised lugs shall be diamond shaped and have an angled pattern. Use 6061-T3 alloy aluminum mill finish with skid resistant surface. All assemblies shall be reinforced on concealed faces as necessary to support the service loads required. Aluminum shall be isolated from dissimilar materials including metals, concrete, masonry and plaster to prevent electrolytic deterioration.

F. Common Bolts. Except as otherwise designated or specified, use 316 S.S. commercial quality bolts. For aluminum work, bolts or fasteners shall be aluminum or non-magnetic stainless steel.

G. Deferred Bolting Devices (DBD) may be used in lieu of anchor bolts only where specifically noted or detailed, and shall be installed in accordance with current International Conference of Building Officials Research Report Approval, and shall consist of the following:

1. Anchorages shall consist of all stainless steel, Type 316, Hilti HSL-R heavy duty expansion

expansion anchors, Hilti HVA adhesive anchors, U.S. Anchor QC epoxy anchors, U.S. anchor CA capsule anchors, or approved equal.

2. DBD will not be acceptable for anchorage of any vibrating machinery or equipment.

3. DBD will not be acceptable for anchorage to hollow or unreinforced CMU.

H. Galvanizing.

1. Iron and Steel. ASTM A123, with average weight per square foot of 2.0 ounces and not less than 1.8 ounces per square foot.

2. Ferrous Metal hardware Items. ASTM A153 with average coating weight of 1.3 ounces per square foot.

3. Touch-Up Material for Galvanized Coatings. Galvanized coatings marred or damaged during erection or fabrication shall be repaired in accordance with Section 09905 "Painting and Protective Coatings".

I. Welding Electrodes.

1. Steel Electrodes. Welding electrodes shall conform with AWS D1.1, except E7024 rods or electrodes shall not be used.

2. Aluminum Electrodes. Contingent upon alloys being welded, use aluminum alloy welding rods of AWS classification conforming to applicable AWS A5 Series of Filler Metal Specification as recommended by parent aluminum manufacturer.

3. Stainless Steel Electrodes. Perform welding of stainless steel with electrodes and techniques as contained in pertinent AWS A5 Series Specification, and as recommended in Welded Austenitic Chromium-Nickel Stainless Steel Techniques and Properties as published by the International Nickel Company, Inc., New York, New York.

J. Shop Prime Paint. To assure compatibility with deferred field applied paint or coating systems, for ferrous metals other than stainless steel, and galvanized steel, use the same shop prime paint product and manufacturer as painting or protective coating system intended for field application specified in Division 9. Portions of work immediately adjacent to intended field welds shall not be shop primed, nor shall portions intended for embedment.

K. Platform Grating.

1. Steel Grating. Provide welded or pressure-locked types of hot dip galvanized steel gratings equal to: Borden Type WB; Reliance Type IR4; or equal like types meeting or exceeding requirements of NAAMM Metal Grating Manual. Throughout use products of single manufacturer.

a. All gratings for spans greater than 3'-0" shall be furnished in pieces approximately 2'-0" in width. All openings required in gratings shall be cut after fabrication but before galvanizing. All openings in gratings shall be banded and this banding done in such a manner as to reestablish the

the original strength of the grating.

b. Seat angles and anchors shall be galvanized steel.

2. Grating fastening devices for metal gratings use either welded or mechanical attachments galvanized after fabrication.

L. Railings. Fabricate handrails from steel pipe with all welded joints and complete with stanchions, true to size, configurations and details shown on the drawings. Grind welds flat and smooth. Handrails shall be hot dipped galvanized after fabrication.

M. Anchors. Anchor bolts for columns shall be as noted on the drawings. Anchors for frames and other miscellaneous members shown anchored into concrete or masonry shall be 316 S.S., unless otherwise noted, and of sizes and spacing as noted. Where size and spacing is not noted, anchors shall be not less than 3/8-inch by 2½" minimum embedment. Unless otherwise noted, anchors shall be spaced no more than 2'-0" on center.

N. Castings. Castings shall be of best quality soft gray cast iron or ductile iron true to pattern, smooth and free from blowholes, cold-shuts, or other defects impairing strength, durability, or appearance. All castings and accessories shall be as specified or equal.

O. Miscellaneous.

1. Fastenings. Use same materials as items fastened unless otherwise specified. Types, sizes, and lengths shall suit conditions.

2. Metal Primer. As specified in Section 09905, "Painting and Protective Coatings".

P. Shelf Angles and Seat Angles. Unless otherwise shown, shelf angles and seat angles shall conform to current edition of ASTM specifications for A36 steel. Embedded seat angles shall be furnished with welded anchor studs. All angles shall be galvanized in accordance with Section 2, above, unless otherwise specified.

PART 3 - EXECUTION

3.01 GENERAL FABRICATION AND INSTALLATION REQUIREMENTS

A. Standards. Ferrous metals shall be thoroughly cleaned of all loose scale and rust before being fabricated. Finished members shall be free of twists, bends or open joints, and shall present a neat workmanlike appearance when completed. Steel work shall conform to the best practices set forth in the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" for the American Institute of Steel Construction, latest edition. Aluminum work shall conform to the applicable requirements of "Specifications for Aluminum Structures, Aluminum Construction Manual" of the Aluminum Association, latest edition.

B. Welding. All welding shall be done in accordance with the "Structural Welding Code-Steel", AWS D1.1 and current revisions. Welders shall be qualified by tests in accordance with AWS B3.0. Welding of aluminum shall conform to the general requirements of AWS D1.0 and to the detail requirements of "Welding aluminum" by the American Welding Society and the Aluminum Association.

C. General Fabrication and Installation. Fabricate in shop using specified new stock of standard size specified or detailed. Form and fabricate to meet required conditions. Include clips, straps, bolts, screws, and other fastenings necessary to secure the Design-Build Work. Conform applicable Design-Build Work to latest edition of Referenced Standards. Accurately make and tightly fit joints and intersections in true planes with secure fastenings. All metal Design-Build Work shall be erected plumb, true on line and in its designated location. Field welds on exposed surface shall be ground and finished smooth. Connections shall be bolted or welded. After installation, all Design-Build Work shall be left in a neat and clean condition, ready for field painting or coating.

1. Coordinate Design-Build Work of this Section with related trades. Particular attention is required for items to be embedded in concrete work. Provide all punchings and drillings indicated or required for attachment of other work to that of this Section.

2. Compliance with Safety Requirements. Dimensions required for the fabrication and installation of grating, pipe hangers and etc., shall conform to the applicable requirements of OSHA Standards.

D. Protection. Provide and be responsible for protection and repair of adjacent surfaces and areas which may become damaged as a result of work of this Section. Protect work performed hereunder until completion and final acceptance of project by the City. Promptly repair or replace all damaged or defective Design-Build Work to original specified condition, at no additional cost to the City.

1. Protect finished floor surfaces and adjacent work from damage. Concrete floors shall not be overloaded. Steel members shall not be placed directly on floors; use pads of timber or other material for cushioning.

2. Where welding is done in proximity to glass or finished surfaces, such surface shall be protected from damage due to weld sparks, spatter, or tramp metal.

E. Painting.

1. All ferrous metals, except stainless steel, shall be coated in accordance with Section 09905 herein. Before priming, surfaces shall be thoroughly cleaned. Shop coats shall be allowed to dry before materials are loaded for delivery to the job site. After erection, all areas where the shop coats have been rubbed off or omitted, and all field bolting and welding shall be painted as specified for shop priming.

2. Aluminum members shall be coated in accordance with Section 09905 herein, and isolated from contact with dissimilar metals, concrete and masonry to provide protection from electrolytic deterioration. Use non-absorptive tape or gaskets, heavy brush coat of approved zinc chromate primer made with a synthetic resin vehicle; or apply a heavy coat of approved alkali-resistant asphaltic bituminous paint.

3.02 SPECIFIC ITEMS

A. List of items hereinafter is not necessarily complete. Check drawings, other Sections of specifications, and other trades to provide miscellaneous iron and steel items as required to complete entire Design-Build Work. Provide fasteners and connectors of approved types for a complete installation, whether or not indicated.

B. Gratings and Handrails.

1. General. Manufacturer shall provide grating lengths to assure an absolute minimum bearing of 1-inch at each end of grating bars when grating is butting either end. Field check as required to satisfy this requirement. Except as otherwise designated, provide banding at all penetrations and at all ends of grating.

2. Install handrail and kickplate in accordance with OSHA Standards.

C. Pipe and Conduit Supports and Bracing. Fabricate and install units in fully coordinated manner with work of other trades. Where shown, hot dip galvanize after fabrication, and touch-up abraded or burned galvanizing using materials specified in Division 9. Otherwise members shall be shop primed with rust-inhibitive primer conforming with requirements of Division 9.

D. Embedded Steel Channel and Angle Frames. Continuously weld joints and grind exposed welds flush.

E. Bollards. Fabricate and install bollards using steel pipe specified in paragraph 2.01A.2. Bollard shall be filled with 3,000 psi concrete specified in Section 03301.

END OF SECTION

SECTION 05511 - METAL STAIRS**1.1 SUMMARY**

- A. Preassembled steel stairs with concrete-filled, precast concrete and epoxy-resin-filled treads.
- B. Industrial-type stairs with steel floor plate, grating treads.
- C. Ornamental steel-framed stairs.
- D. Aluminum and Steel pipe railings attached to metal stairs.
- E. Aluminum and Steel pipe handrails attached to walls adjacent to metal stairs.

1.2 PERFORMANCE REQUIREMENTS

- A. Engineering design of steel stairs, handrails and railing systems by Company.

1.3 QUALITY ASSURANCE

- A. Stair Standard: NAAMM AMP 510.
 - 1. Preassembled Stairs: Commercial class.
 - 2. Industrial-Type Stairs: Industrial class.
 - 3. Ornamental Stairs: Architectural class.

1.4 MATERIALS

- A. Metals:
 - 1. Steel plates, shapes, and bars.
 - 2. Steel tubing.
 - 3. Rolled-steel floor plate.
 - 4. Abrasive-surface floor plate.
 - 5. Galvanized steel sheet.
- B. Abrasive Nosings:
 - 1. Extruded aluminum.
- C. Abrasive-coating-finished treads.
- D. Metal bar-grating treads.
- E. Aluminum and Steel Tube Railings:

1. Configuration: Round top and bottom rails and posts with 1/2-inch- (13-mm-) square pickets spaced less than 4 inches (100 mm) clear.
2. Configuration: Square top and bottom rails and posts with infill panels made from expanded metal.
3. Configuration: Square top, bottom, and intermediate rails and square posts with intermediate rails less than 21 inches (533 mm) clear.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.
- B. Calculations by Specialty Engineer

END OF SECTION 05511

SECTION 05521 - PIPE AND TUBE RAILINGS**1.1 SUMMARY**

- A. Aluminum pipe railings.
- B. Steel pipe and tube railings.

1.2 QUALITY ASSURANCE

- A. Fabricator to engineer and fabricate railings to withstand design loads as indicated in the latest edition of the OSHA Standards.

1.3 FABRICATION

- A. Changes in Direction of Members: By bending or by inserting prefabricated fittings.
- B. Connections: Welded
- C. Infill Panels: Expanded metal and woven-wire mesh.
- D. Toe boards.

1.4 FINISHES

- A. Aluminum: 3-coat fluoropolymer.
- B. Steel: Galvanized pipe, repair painted at welds, primed and painted.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.
- B. Calculations by Specialty Engineer

END OF SECTION 05521

SECTION 05811 - ARCHITECTURAL JOINT SYSTEMS**1.1 SUMMARY**

- A. Architectural joint systems for building interiors and building exteriors.

1.2 ARCHITECTURAL JOINT SYSTEMS, GENERAL

- A. Size and Movement Characteristics:

1. Nominal Joint Width: As indicated on Drawings.
2. Movement Capability: As indicated on Drawings.
3. Type of Movement: Wind sway.

1.3 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING INTERIORS

- A. Floor-to-Floor and Floor-to-Wall Joint Systems:

1. Type: Cover plate, Center plate, Glide plate, Hidden sightline, Pan, Surface mounted Elastomeric seal and Dual elastomeric seal.
2. Exposed Metal: Aluminum
3. Fire-Resistance Rating: As indicated.

- B. Wall-to-Wall, Wall Corner, Wall-to-Ceiling and Ceiling-to-Ceiling Joint Systems:

1. Type: Cover plate, Glide plate, Snap-on cover, Clip-in cover, Elastomeric seal, Dual elastomeric seal.
2. Exposed Metal: Aluminum
 - a. Aluminum Finish: Class I, color anodic
3. Fire-Resistance Rating: As indicated

- C. Moisture Barrier: Manufacturer's standard.

1.4 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING EXTERIORS

- A. Exterior Wall and Soffit Joint Systems:

1. Type: Vertical cover plate, Flat seal, Pre-formed cellular foam.
2. Exposed Metal: Aluminum
 - a. Aluminum Finish: Class I, color anodic
3. Fire-Resistance Rating: As indicated.

- B. Secondary Seal: Manufacturer's standard.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 05811

SECTION 06105 - MISCELLANEOUS CARPENTRY**1.1 SUMMARY**

- A. Wood blocking and nailers.
- B. Wood furring and grounds.
- C. Wood sleepers.
- D. Interior wood trim.
- E. Shelving and clothes rods.
- F. Plywood backing panels.

1.2 QUALITY ASSURANCE

- A. Forest certification by an FSC-accredited certification body for the following:
 - 1. Dimension lumber framing.
 - 2. Miscellaneous lumber.
 - 3. Interior wood trim.
 - 4. Shelving and clothes rods.

1.3 MATERIALS

- A. Wood-Preservative-Treated Materials:
 - 1. Preservative Treatment: AWPA C2 with chemicals containing no arsenic or chromium.
 - a. AWPA C31 (inorganic boron) may be used in protected locations.
 - 2. Application: Items indicated and the following:
 - a. Items in contact with roofing or waterproofing.
 - b. Items in contact with concrete or masonry.
 - c. Framing less than 18 inches (460 mm) above ground in crawlspaces.
 - d. Floor plates installed over concrete slabs-on-grade.
- B. Fire-Retardant-Treated Materials:
 - 1. Exterior type for exterior locations and where indicated.
 - 2. Interior Type A, High Temperature (HT) for enclosed roof framing, and where indicated.
 - 3. Interior Type A, unless otherwise indicated.
 - 4. Application: Items indicated and the following:
 - a. Framing in rated construction.

- b. Concealed blocking.
 - c. Roof construction.
 - d. Plywood backing panels.
- C. Interior Wood Trim:
 - 1. Lumber Trim for Opaque (Painted) Finish: White pine or closed-grain hardwoods.
 - 2. Moldings for Opaque (Painted) Finish: White pine, White hardwoods, Primed medium-density fiberboard.
- D. Shelving: Medium-density fiberboard with wood edge.
- E. Clothes Rods: Hardwood rods, Softwood rods, Aluminum tubes, Chrome-plated steel tubes and Stainless-steel tubes.
- F. Plywood backing panels for telephone and electrical equipment.
- G. Fasteners: Hot-dip galvanized and Stainless steel where exposed to weather, in ground contact, in contact with treated wood, or in area of high relative humidity.
- H. Metal Framing Anchors:
 - 1. Metal: Hot-dip galvanized steel; stainless steel for exterior and where indicated.

1.4 INSTALLATION

- A. Furring to Receive Plywood or Hardboard Paneling: 1-by-3-inch nominal- (19-by-63-mm actual-) size furring at 24 inches (610 mm) o.c.
- B. Furring to Receive Gypsum Board: 1-by-2-inch nominal- (19-by-38-mm actual-) size furring at [16 inches (406 mm) o.c.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 06105

SECTION 06160 - SHEATHING**1.1 SUMMARY**

- A. Wall sheathing.
- B. Roof sheathing.
- C. Composite nail base insulated roof sheathing.
- D. Sheathing joint-and-penetration treatment.
- E. Flexible flashing at openings in sheathing.

1.2 QUALITY ASSURANCE

- A. Forest certification by a Forest Stewardship Council-accredited certification body for the following:
 - 1. Plywood.
 - 2. Oriented strand board.
 - 3. Fiberboard wall sheathing.

1.3 MATERIALS

- A. Preservative-Treated Plywood:
 - 1. Preservative Treatment: AWWPA C9 with chemicals containing no arsenic or chromium.
 - 2. Application: Treat plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.
- B. Fire-Retardant-Treated Plywood:
 - 1. Exterior type for exterior locations and where indicated.
 - 2. Interior Type A, High Temperature (HT) for roof sheathing and where indicated.
 - 3. Interior Type A, unless otherwise indicated.
 - 4. Application: Treat the following:
 - a. Roof sheathing at fire and party walls.
 - b. Wall sheathing at fire and party walls.
 - c. Roof sheathing.
- C. Wall Sheathing:
 - 1. Plywood: Exposure 1, Structural I, 1/2 inch (13 mm) thick or as determined by engineer or applicable product approval if part of exterior wall and/or roof system.
 - 2. Paper-Surfaced Gypsum: Type X, 5/8 inch (15.9 mm) thick.
 - 3. Glass-Mat Gypsum: Type X, 5/8 inch (15.9 mm) thick.

4. Cellulose Fiber-Reinforced Gypsum: Type X, 5/8 inch (15.9 mm) thick.
5. Fiberboard: [1/2 inch (13 mm)] [25/32 inch (20 mm)] thick.
6. Foil-Faced Polyisocyanurate Foam 1 inch (25 mm) thick or as determined by required insulation vales and LEED energy model requirements.

D. Roof Sheathing:

1. Plywood: As called for by roofing system manufacture's product approved (NOA) installation.
2. Oriented Strand Board: As called for by roofing system manufacture's product approved (NOA) installation.

E. Fasteners: Hot-dip galvanized steel where exposed to weather, in ground contact, in contact with treated wood, or in area of high relative humidity.

F. Miscellaneous Materials:

1. Building paper
2. Sealant for gypsum sheathing.
3. Sheathing tape.
4. Adhesives, VOC content of 70 g/L or less.
5. Flexible Flashing: Self-adhesive.

1.4 INSTALLATION

A. Wood Structural Panel:

1. Sheathing:
 - a. Screw to cold-formed metal framing..

B. Gypsum Sheathing:

1. Screw to cold-formed metal framing.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 06100

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL (Not Applicable)

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 06200

SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK**1.1 SUMMARY**

- A. Interior standing and running trim.
- B. Interior frames and jambs.
- C. Plastic-laminate cabinets.
- D. Plastic-laminate and solid-surfacing-material countertops.
- E. Laminated-plastic laboratory tops.
- F. Closet and utility shelving.

1.2 QUALITY ASSURANCE

- A. Forest certification by a Forest Stewardship Council-accredited certification body.
- B. Quality Standard: AWI.
- C. Mockups for each form of construction and finish.

1.3 MATERIALS

- A. Wood Species and Cut for Transparent Finish: As indicated on drawing.
- B. Wood Species for Opaque Finish: Any closed-grain hardwood.
- C. Composite Wood Products: Made without urea formaldehyde.
- D. Cabinet Hardware:
 - 1. Hinges: Butt, semiconcealed.
 - 2. Pulls: Back-mounted
 - 3. Locks: Drawer.
 - 4. Exposed Hardware Finishes: Dark, oxidized, satin bronze.
- E. Interior Woodwork Grade: Premium
- F. Interior Standing and Running Trim for Opaque Finish:
 - 1. Grade: Premium.Wood Species: Any closed-grain hardwood.
- G. Interior Frames and Jambs for Opaque Finish:

1. Grade: Premium.
 2. Species: Any closed-grain hardwood.
- H. Interior Ornamental Work for Opaque Finish:
1. Grade: Premium.
 2. Wood Species: Any closed-grain hardwood.
- I. Wood Cabinets for Opaque Finish:
1. Grade: Laboratory.
 2. AWI Type of Cabinet Construction: Flush overlay.
 3. Cabinet Interior: Thermoset decorative panels.
- J. Plastic-Laminate Cabinets:
1. Grade: Laboratory.
 2. AWI Type of Cabinet Construction: Flush overlay.
 3. Cabinet Interior: Thermoset decorative panels.
- K. Plastic-Laminate Countertops:
1. Grade: Economy
 2. Edge Treatment: Lumber edge matching cabinets.
- L. Solid-Surfacing-Material Countertops:
1. Grade: Standard
 2. Thickness: 1/2 inch (13 mm).
- M. Laminated-Plastic Laboratory Tops: Premium grade with chemical-resistant laminate.
- N. Closet and Utility Shelving: Economy grade.
- O. Shop Finishing:
1. Grade: Same grade as woodwork.
 2. Grade: Standard for opaque finish.
 3. Extent: All woodwork shop finished.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 06402

SECTION 06600

FIBERGLASS REINFORCED PLASTIC PRODUCTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide miscellaneous fiberglass work and fiberglass fabrications, complete with all appurtenances, accessories, and incidentals as indicated, specified and required.

B. Design-Build Work Included in This Section:

1. Fiberglass Reinforced Plastic (FRP) Grating.

1.02 SUBMITTALS

A. Submit the following in accordance with Appendix 5 of the Service Contract.

1. Shop Drawings and Erection Drawings. Show materials and specification list, construction and fabrication details, layout and erection diagrams, incidental supports and method of anchorage to adjacent construction. Give location, type, size and extent of bolted connections and clearly distinguish between shop and field connections. Prior to submittal, coordinate shop drawings with related trades to ensure proper mating of assemblies. Conform work to approved shop drawings.

a. Catalog work sheets showing illustrated cuts of items to be furnished, scale details and dimensions may be submitted for standard manufactured items.

b. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site prior to fabrications as field dimensions may vary from drawing dimensions. Where concrete, masonry or other materials must be set to exact locations to receive work, furnish assistance and direction necessary to permit other trades to properly locate their work. Where welded connectors, concrete, or masonry inserts are required to receive work, shop drawings shall show exact locations required, and all such drawings shall be furnished to the trades responsible for installing the connectors or inserts.

c. All design calculations signed and sealed by a Professional Engineer registered in the State of Florida.

2. Test Reports. Furnish manufacturer's certified physical and corrosion-resistance test reports for fiberglass reinforced plastic elements which show resistance to specified loads and atmospheric conditions typical of this project. Manufacturer shall also supply a certified letter confirming the accuracy of the submitted test reports.

D. Samples. Submit triplicate samples of all fiberglass products specified in this Section, including the following:

1. Submit samples clearly marked as to type, coating, thickness, color, sealing, protective coating, and identified as to which portion of the Design-Build Work the sample represents. Samples must be actual production sections of both pultrusions and sheets, of size sufficient that comparisons can be made to establish allowable color range. Design-Build Work provided must be within the approved color range. Promptly submit additional samples to replace any rejected samples, at no extra cost to the City. The processing of FRP products is not to start until the City Engineer's approval has been obtained.

2. Approved samples, returned to the Company in duplicate, shall be used for control purposes during production finishing. The Company shall protect and retain the samples for the duration of the Design-Build Work.

1.03 JOB CONDITIONS

A. Fiberglass structural shapes and grating will be installed as specified herein and shown on the drawings. All materials shall be resistant to moisture, sunlight and ultraviolet exposure, and intermittent wetting and submergence. All mechanical fasteners to connect FRP items shall be made of Type 316 stainless steel.

1.04 QUALITY ASSURANCE

A. All items furnished under this Section shall be furnished by a manufacturer having a demonstrated record of at least five years experience on similar, successful installations. All materials provided shall be handled in strict accordance with the manufacturer's recommendations.

B. All fiberglass products shall be as manufactured by IKG Borden, Leeds, Alabama; Fibergrate, Dallas, Texas, Chemgrate, Woodinville, Washington, or approved equal.

PART 2 - PRODUCTS

2.01 GRATING

A. Design. Grating shall be pultruded 1½ inches high as shown on the drawings. All grating shall have an anti-skid grit surface integrally molded or securely bonded into the walking surface.

B. Material. Resins shall be isophthalic polyester. All finished areas shall be resin rich, smooth, free of voids and without cracks, crazes, or unreinforced areas. All glass fibers shall be well covered with resin for protection. Grating shall have a resin content of 60-70 percent and a glass content of 30-40 percent (by weight) in the reinforced portion.

C. Properties. Grating shall have a minimum flexural strength of 36,000 psi per ASTM D790 test procedure as tested on full thickness of grating.

D. Load/Deflection: Grating shall meet manufacturer's published safe recommended loadings with deflection not to exceed the following at the spans shown on the drawings:

1. Uniformly Distributed Safe Load. 100 pounds per square foot, or as shown on the drawings.

2. Ratio of Span L/D Deflection D. L/D minimum, 100 or as shown on the drawings.

E. All FRP grating shall be an industry standard yellow unless otherwise noted on the drawings.

2.02 MISCELLANEOUS SHAPES

- A. Fiberglass shapes shall utilize the pultrusion process. Composite shall be an isophthalic thermosetting resin reinforced with longitudinal fiberglass rovings and continuous strand mats, sandwiched between polymeric synthetic surface veils incorporated in the laminate for maximum chemical and ultra-violet protection.
- B. Color shall be pigmented throughout the laminate. FRP shapes shall be pigmented yellow. All materials shall meet UL-94-V, ASTM-D-635 at no ignition and Class 1 flame rate of 25 or less per ASTM-E-84.
- C. Fasteners shall be 316 stainless steel unless otherwise specified.
- D. Dimensional tolerances of pultruded fiberglass shapes shall be as per ASTM D3917 "Standard Specifications for Dimensional Tolerances of Thermosetting Glass, Reinforced Plastic Pultruded Shapes".

PART 3 - EXECUTION

3.01 GENERAL

- A. All FRP members shall have all cut edges and holes lightly sanded and sealed with a general purpose polyester resin or equal material to prevent corrosive attack. The Company shall exercise all precautions necessary to protect FRP shapes and gratings from abuse to prevent breakage, warpage, nicks, gouges, etc., during handling and installation.

3.02 GRATING

- A. The Company shall furnish and install FRP grating where indicated on the drawings in accordance with the recommendations of the fabricator and the approved shop drawings. All field cut edges and holes shall be treated as per paragraph 3.01 above. Unless specifically noted on the drawings, each grating panel shall be readily removable. Company shall coordinate all grating openings and penetrations and shall provide adequate support wherever required and in accordance with the manufacturer's recommendations.

END OF SECTION

SECTION 07100
WATERPROOFING AND DAMPPROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide below grade membrane waterproofing and dampproofing work, complete as indicated, specified and required.
- B. Design-Build Work Included in This Section. Principal items are:
 - 1. Waterproofing of earth supporting below grade wall surfaces which enclose areas such as below grade vaults and the elevator pit.
 - 2. Furnishing and installing vapor barriers under all building slabs on grade.
- C. Related Design-Build Work Not Included in This Section.
 - 1. Painting and protective coating work and above grade masonry waterproofing specified in pertinent sections of other divisions.
 - 2. Joint Sealant specified in Section 07920.

1.02 SUBMITTALS

- A. Prior to purchase or delivery of materials, submit the following and obtain City Engineer's approval in accordance with Appendix 5 of the Service Contract. Submittals shall be made in sufficient time to allow for approval and, if necessary, disapproval and resubmittal without causing delay of the project.
- B. Complete supporting technical data, descriptions and details of each preparation and application procedure for each system intended to be used.
- C. Qualifications. Waterproofing applicators shall be approved in writing by the system material manufacturer for each type of system to be applied.

1.03 GUARANTEE

- A. Provide a written five (5) year guarantee against leakage within waterproofed areas. The guarantees shall commence on the date of substantial completion. Occurrence of leakage or failure of coating during guarantee period shall be acceptably corrected by the Company, who shall absorb all costs relating to all corrective work, materials, preparations and precautions necessary for performance of corrective measures.

1.04 RIGHT OF REJECTION

- A. The City shall have the right to reject all unsatisfactory work or material, and require replacement of either or both at the expense of the Company.

1.05 PRODUCT HANDLING

- A. Delivery. Deliver materials to site in original unbroken packages bearing manufacturer's label showing brand and weight.
- B. Storage. Store materials at site under cover, maintain in dry condition until ready for use. Stack felts and roll goods on ends.

PART 2 - PRODUCTS

2.01 MATERIALS - GENERAL

- A. All materials for a system shall be as recommended and furnished by a single manufacturer.

2.02 MEMBRANE MATERIALS FOR WATERPROOFING EXTERIOR BELOW GRADE SURFACES

- A. Membrane Material. Herein specified membranes, at Company's option as approved by the City Engineer, shall be either a hot-applied coal tar bitumen system, or a cold-applied coal tar based foundation coating system, or equal system. Company to coordinate with concrete work to assure functional water tight installation.

- B. Materials for Hot-Applied Coal Tar System (Option No. 1).

- 1. Tarred felts, ASTM D-227 No. 15, 36 inches wide, tar saturated.
- 2. Creosote priming oil, ASTM D-43.
- 3. Coal tar Bitumen, ASTM D-450.
- 4. Coal tar base roof cement. Fed. Spec. SS-C-153, Type II, for sealing top edge.
- 5. Tar saturated cotton fabric, ASTM D173 for reinforcing membrane penetrations and angles.
- 6. Protection Board, 1/2 inch fiberboard.

- C. Material Summary for Coal Tar Hot Applied Membrane - Weights per 100 sq. ft. (Option No. 1).

Concrete priming oil (1 coat at 1 gal. per 100 sq. ft.)	---
Coat tar bitumen mopping to receive first layer	30 lbs.
No. 15 tar saturated felt (3 layers)	45 lbs.
Tar bitumen moppings between layers (2 at 25 lbs. ea.)	50 lbs.
Final coat to receive protection board	25 lbs.
1/2 inch fiberboard protection board	---

Approximate Total Weight	150 lbs.
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- D. Materials for Cold Applied Coal Tar System (Option No. 2).

- 1. Tar coated glass fabric, ASTM D-1668-73, Type II.
- 2. Foundation coating, coal tar base, solvent type.
- 3. Protection Board, 1/2 inch fiberboard.

E. Material Summary for Coal Tar Cold Applied Membrane - Weights per 100 sq. ft. (Option No. 2).

Foundation coating (70-80 sq. ft. per gal.)	12 lbs.
Glass fabric, tar coated (2 layers-approx. wt.)	2 lbs.
Tar based coatings between plies (1 at 12 lbs. each)	12 lbs.
Final Coating	12 lbs.
1/2 inch fiberboard protection board	---

Approximate Total Weight 38 lbs

For slab membranes, in this Option No. 2, use the above specified Option No. 1 hot-applied coal tar membrane materials flashed into abutting cold applied coal tar membraned vertical surfaces using herein specified cold applied reinforcing (flashing) materials.

F. Base and Slab. Preparation to receive waterproof membrane under the base slab shall consist of a 4-inch layer of crushed rock with a 2-inch thick lean concrete slab cover.

The crushed rock and the concrete waste slab shall extend at least 1 foot beyond the edge of the structural bottom slab to allow for the fold up and interlamination of waterproof membrane slab plies into the wall membrane plies as recommended by the material manufacturer.

G. Equipment. Use fully operative equipment and tools as recommended and/or approved by membrane material manufacturer for use in melting and spraying or manual application of materials.

2.03 VAPOR BARRIER

A. The vapor barrier shall be 10 mil thick polyethylene sheet with a vapor transmission rating of 0.20 perms. Laps between adjacent sheets shall be 10 inches minimum with 2 inch wide "Scotch" glass filament tape. The vapor barrier shall be carefully inspected by the City Engineer prior to concrete placement. Additional polyethylene sheet required for repair or replacement of damaged vapor barrier shall be furnished and installed by the Company as directed by the City Engineer at no additional cost to the City.

PART 3 - EXECUTION

3.01 GENERAL - EXECUTION

A. Manufacturer's Recommendations. Surface preparation, surface conditions, material mixing, application and reinforcing shall conform with material manufacturer's printed recommendations. Company shall arrange for system material manufacturer to provide a representative on the site at the initiation of this Design-Build Work.

B. Surface Preparation. All substrata surfaces shall be clean, free of excessive dampness, frost, dust, laitance or loose concrete, and films of oil, grease, curing compounds, or other substances which would affect the adhesion of waterproofing. All penetration shall be in place and secured in final position. Expansion joints shall be sharply formed and free of broken edges or loose aggregates and be completely free of preformed joint fillers, sealants, or back-up materials to a depth of at least

least twice joint width. All concrete surfaces shall be surface dry and cured for a minimum of fourteen days, free of voids, loose stones, and sharp protrusions.

- C. Surface Examinations. Before commencing Design-Build Work, examine all areas, and report in writing all conditions which would adversely affect the waterproofing. Beginning Design-Build Work of this Section without reporting and correction of unsuitable conditions constitutes Company's acceptance of conditions. Any required removal, repair, or replacement of this work caused by unsuitable conditions shall be done at no added cost to the City.
- D. Protection of Work. Applicator shall be responsible for any and all damage to his work or work of other trades during the time his work is in progress. Hardware, hardware accessories, machined surfaces and similar items in contact with waterproofing and which are not to be coated shall be removed or masked prior to surface preparation and application of waterproofing. After application of water proofing, each piece of removed equipment shall be replaced. Such removal and replacement shall be performed by workmen skilled in the involved trades.

3.02 MEMBRANE WATERPROOFING OF EXTERIOR BELOW GRADE SURFACES

- A. Company's Option. As approved by City Engineer, system selected from those optional systems specified shall be at Company's options. All membranes shall be complete and shall include flashings (reinforcements) over footings, penetrations, angles, joints and cracks and shall consist of specified materials and system.
- B. Application of Coal Tar Hot Applied Membrane System (Option No. 1)
 - 1. Prime vertical concrete surfaces at the rate of one gallon per 100 sq. ft. and allow to dry.
 - 2. Coal Tar Bitumen. Apply bitumen at a temperature between 350 and 400 degrees F. Do not heat higher than 425 degrees F. Rollers may be used for application of wall membrane.
 - 3. Felts. At slabs, solid mop felts shingle fashion in hot coal tar bitumen beginning at the low point, and extending "dry" sufficiently beyond edge of wall footing lines to permit necessary fold-up and interlamination of wall and horizontal plies at joint after stripping of wall forms. Install wall membranes vertically in hot coal tar bitumen in courses not to exceed 10 feet in length. Lap sides of plies per manufacturer's recommendations contingent on location and number of plies. Broom felts thoroughly into hot bitumen to assure adhesion eliminates trapped air. Apply without wrinkles or buckles.
 - 4. Before top mopping, nail each course of vertical membrane at upper edge before next course is applied. Nail each succeeding course, end lapping not less than 10 inches. Nail laps and top of wall membrane edges at 8 inches O.C. through flat tin discs. Seal membrane at top of wall termination with two coats of pitch base roof cement and one layer of cotton fabric.
 - 5. Reinforce angles, corners, wall/slab membrane laps, and any place that waterproofing membrane may be subject to unusual stresses with not less than two additional plies of tar saturated cotton fabric reinforcement, each embedded in mopping of bitumen.
 - 6. Three course all penetrations using pitch base plastic cement and fabric after membrane has been applied as tight as possible.
 - 7. Apply membrane waterproofing system in a workmanlike manner.
 - 8. Apply final coat of waterproofing pitch and embed protection course.
- C. Application of Cold-Applied Coal Tar Membrane (Option No. 2)

1. Coating Applications. Spray, trowel or brush-on material at the rate of 70 to 80 square feet per gallon.
2. Glass Fabric. Fully embed courses of 20x10 mesh glass fabric in coal tar bitumen by brushing. Eliminate all wrinkles, holidays, and buckles.
3. Reinforce laps of vertical and horizontal membranes, all angles, all penetrations and wall membrane edges with two or more additional applications of coating and glass fabric.
4. Apply final coat of coal tar bitumen foundation coating to applied glass fabric.
5. Provide slab membranes for this Option No. 2 using materials and methods herein before specified for Option No. 1 hot-applied coal tar system, complete with flashings and reinforcements.
6. Apply protection board by embedding in final coating or spot cement thereto with pitch-base roof cement.

3.03 VAPOR BARRIER

- A. The plastic vapor barrier shall be placed over the backfill and under the concrete floor slab. The plastic sheets shall be lapped 10 inches at joints and sealed with tape and the sheets shall be turned up the wall at the edges of the slab. Tears caused by sharp stones or placement of rebar shall be repaired with additional film and taped in place.

3.04 FIELD QUALITY CONTROL

- A. Carefully inspect waterproof treatments before covering, and patch any ruptures or holidays with additional material.

3.05 CLEAN-UP

- A. Keep premises free from accumulation of waste materials and rubbish.

END OF SECTION

SECTION 07162 - CRYSTALLINE WATERPROOFING**1.1 SUMMARY**

- A. Crystalline waterproofing.

1.2 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Mockups of crystalline waterproofing.

1.3 WARRANTY

- A. Materials and Workmanship: Ten (10) years.

1.4 PRODUCTS

- A. Crystalline waterproofing.
- B. Patching compound.
- C. Plugging compound for leak repair.

1.5 APPLICATION

- A. Apply waterproofing to negative-side surfaces.
- B. Number of Coats: Two.
- C. Apply protective floor topping over floor surfaces.

1.6 FIELD QUALITY CONTROL

- A. Manufacturer's representative to inspect completed application.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 07162

SECTION 07163 - METAL-OXIDE WATERPROOFING**1.1 SUMMARY**

- A. Metal-oxide waterproofing.

1.2 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Mockups of metal-oxide waterproofing.

1.3 WARRANTY

- A. Materials and Workmanship: Ten(10) years.

1.4 PRODUCTS

- A. Metal-oxide waterproofing.
- B. Lead-wool calking.
- C. Cementitious patching for leak repair.

1.5 APPLICATION

- A. Apply 1 bond coat and 2 waterproof coats with a thickness of **1/16 inch (1.6 mm)** per coat.
- B. Apply protection coat with a thickness of **1/4 inch (6 mm)** for walls and **1 inch (25 mm)** for floors.

1.6 FIELD QUALITY CONTROL

- A. Manufacturer's representative to inspect completed application.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 07163

SECTION 07210 - BUILDING INSULATION**1.1 SUMMARY****A. Applications:**

1. Concealed building insulation.
2. Loose-fill building insulation.
3. Self-supported, spray-applied cellulosic insulation.
4. Radiant barriers.
5. Vapor retarders.
6. Sound attenuation insulation.

1.2 PERFORMANCE REQUIREMENTS

- A. Plenum Rating: Glass-fiber insulation rated for resistance against erosion and mold growth per UL 181.

1.3 MATERIALS

- A. Insulation R values to be determined by FBC 2007 with 2009 revisions and LEED energy model requirements

B. Insulation:

1. Extruded-Polystyrene Board:
2. Extruded-Polystyrene Drainage Panels:
3. Molded-Polystyrene Board:
4. Foil-Faced Polyisocyanurate Board:
5. Unfaced, Flexible Glass-Fiber Board:
6. Foil-Faced, Flexible Glass-Fiber Board:
7. Unfaced, Glass-Fiber Board:
8. Foil-Faced, Glass-Fiber Board:
9. Glass-Mat-Faced, Glass-Fiber Board:
10. Unfaced Glass-Fiber Blanket:
11. Faced Glass-Fiber Blanket:
12. Self-Supported, Spray-Applied, Cellulosic:

C. Vapor Retarders: Polyethylene**D. Auxiliary Insulating Materials:**

1. Eave ventilation troughs.
2. Insulation fasteners.

END OF SECTION 07210

SECTION 07411 - METAL ROOF PANELS**1.1 SUMMARY**

- A. Factory-formed and field-assembled, standing-seam panels.

1.2 PERFORMANCE REQUIREMENTS

- A. Air Infiltration: ASTM E 1680.
- B. Water Penetration: ASTM E 1646.
- C. Hydrostatic-Head Resistance: ASTM E 2140.
- D. Wind-Uplift Resistance: UL 580.
- E. FMG listed.
 - 1. Fire/Windstorm Classification: Class 1-90 installed over minimum 16 gauge open framing or minimum 22 gauge steel deck.
- F. Structural Performance: ASTM E 1592.
 - 1. Wind Loads: All provisions of the Florida Building Code and the requirements of Miami-Dade wind borne debris regions shall apply..
 - 2. Deflection Limits.: Deflection shall be limited to 1/360 of span
 - 3. Solar Reflectivity/Emissivity: LEED SRI 78

1.3 QUALITY ASSURANCE

- A. Mockups for each form of construction.

1.4 WARRANTY

- A. Materials and Workmanship: Two (2) years.
- B. Finishes: 20 years.
- C. Weathertightness: 10 years.
- D. Weathertightness for Standing-Seam Metal Roof Panels: 20 years.

1.5 MATERIALS

- A. Polyethylene vapor retarder.

- B. Field-Installed Thermal Insulation: Faced, polyisocyanurate board.
- C. Self-adhering, high-temperature sheet underlayment.
- D. Felt underlayment.
- E. Slip sheet.
- F. Substrate Boards: Glass-mat gypsum sheathing board.
- G. Miscellaneous Metal Framing: Z-shaped furring.

1.6 PRODUCTS

- A. Standing-Seam Metal Roof Panels:
 - 1. Profile: Vertical rib, seamed joint.
 - 2. Material: Zinc-coated (galvanized) steel sheet.
 - 3. Exterior Finish: Fluoro finish, consisting of .2 mil. Primer with .8 mil. 70% Kynar 500 or Hylar 5000 color coat.
- B. Metal Soffit Panels:
 - 1. Match metal roof panels in profile, material, and finish.
 - 2. Profile: Flush.
 - 3. Material: Match metal roof panels.
 - 4. Exterior Finish: Match metal roof panels
- C. Accessories:
 - 1. Flashing and trim.
 - 2. Roof curbs.
 - 3. Pipe flashing.

1.7 FIELD QUALITY CONTROL

- A. Testing: By : Company-engaged agency.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.
- B. LEED Submittals
- C. Submit 2' x 2' panel sample with color and seam.

END OF SECTION 07411

SECTION 07412 - METAL WALL PANELS

1.1 SUMMARY

- A. Factory-formed and field-assembled [**exposed-fastener, lap-seam metal wall**] [**concealed-fastener, lap-seam metal wall**] [**metal liner**] [**and**] [**metal soffit**] panels.

1.2 PERFORMANCE REQUIREMENTS

- A. Air Infiltration: ASTM E 283.
- B. Water Penetration under Static Pressure: ASTM E 331.
- C. Water Penetration under Dynamic Pressure: AAMA 501.1.
- D. Structural Performance: ASTM E 1592.
 - 1. Wind Loads: All provisions of the Florida Building Code and the requirements of Miami-Dade wind borne debris regions shall apply.
 - 2. Deflection Limits: Deflection shall be limited to 1/360 of span.

1.3 QUALITY ASSURANCE

- A. Mockups for each form of construction.

1.4 WARRANTY

- A. Materials and Workmanship: Two (2) years.
- B. Finishes: Twenty (20) years.

1.5 MATERIALS

- A. Field-Installed Thermal Insulation: Faced, polyisocyanurate board.
- B. Miscellaneous Metal Framing: Subgirts, base or sill angles or channels, hat-shaped, rigid furring channels and Z-shaped furring.

1.6 PRODUCTS

- A. Exposed-Fastener, Lap-Seam Metal Wall Panels:
 - 1. Profile: Corrugated, box rib.
 - 2. Material: Zinc-coated (galvanized) steel sheet.

3. Exterior Finish: Fluoro finish consisting of .2 mil. primer with .8 mil. 70% Kynar 500 or Hylar 5000 color coat.

B. Concealed-Fastener, Lap-Seam Metal Wall Panels:

1. Profile: **Flush, Reveal joint.**
2. Material: Zinc-coated (galvanized) steel sheet.
3. Exterior Finish: Fluoro finish consisting of .2 mil. primer with .8 mil. 70% Kynar 500 or Hylar 5000 color coat.

C. Metal Liner Panels:

1. Profile: Flush.
2. Material: Zinc-coated (galvanized) steel sheet.
3. Exterior Finish: Fluoro finish consisting of .2 mil. primer with .8 mil. 70% Kynar 500 or Hylar 5000 color coat.

D. Accessories: Flashing and trim.

1.7 FIELD QUALITY CONTROL

- A. Testing: By Company-engaged agency.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 07412

SECTION 07620 - SHEET METAL FLASHING AND TRIM**1.1 SUMMARY****A. Manufactured Flashing and Trim:**

1. Through-Wall Ribbed Sheet Metal Flashing: Stainless Steel.
2. Reglets: Aluminum, Galvanized steel.
 - a. Type: Surface mounted.

B. Formed Low-Slope Roof Flashing and Trim:

1. Roof edge flashing (gravel stop) and fascia caps.
2. Copings.
3. Roof expansion-joint covers.
4. Base flashing.
5. Counterflashing.
6. Flashing receivers.
7. Roof-penetration flashing.
8. Splash pans.
9. Roof-drain flashing.

C. Formed Steep-Slope Roof Flashing and Trim:

1. Apron, step, cricket, and backer flashing.
2. Valley flashing.
3. Drip edges.
4. Eave flashing.
5. Base flashing.
6. Counterflashing.
7. Flashing receivers.
8. Roof-penetration flashing.

D. Formed Wall Flashing and Trim:

1. Through-wall flashing.
2. Openings flashing in frame construction.
3. Wall expansion-joint covers.

E. Miscellaneous Formed Flashing:

1. Formed equipment support flashing.
2. Formed overhead-piping safety pans.

1.2 PERFORMANCE REQUIREMENTS

- A. Roof Edge Flashing and Copings: Capable of resisting Applicable Wind Zone forces according to Florida Building code.

1.3 QUALITY ASSURANCE

- A. Quality Standard: SMACNA's "Architectural Sheet Metal Manual."
- B. Mockup.

1.4 MATERIALS

- A. Sheet Metals for Flashing and Trim:
 - 1. Aluminum: Factory prime coating and painted.
 - 2. Stainless Steel: Dull, cold rolled.
 - 3. Zinc-tin alloy-coated stainless steel.
 - 4. Zinc-coated (galvanized) steel.
 - 5. Aluminum-zinc alloy-coated steel.
 - 6. Lead.
 - 7. Zinc.
- B. Underlayment: Polyethylene sheet.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 07620

SECTION 07720 - ROOF ACCESSORIES**1.1 SUMMARY**

- A. Roof curbs.
- B. Equipment supports.
- C. Dropout-type heat and smoke vents.
- D. Hatch-type heat and smoke vents.
- E. Gravity ventilators.
- F. Roof supports.
- G. Preformed flashings.

1.2 QUALITY ASSURANCE

- A. Sheet Metal Standard: SMACNA's "Architectural Sheet Metal Manual."
- B. Heat and Smoke Vents: UL and NFPA compliant; UL listed and FMG approved and tested.

1.3 WARRANTY

- A. Special Warranty on Painted Finishes: 20 years from date of Substantial Completion.

1.4 PRODUCTS

- A. Roof Curbs: Galvanized steel, Aluminum-zinc alloy-coated steel or Prepainted, metallic-coated steel.
- B. Equipment Supports: Aluminum-zinc alloy-coated steel or Prepainted, metallic-coated steel.
- C. Roof Hatches: Galvanized steel, Aluminum-zinc alloy-coated steel or Prepainted, metallic-coated steel.
- D. Dropout-Type Heat and Smoke Vents: Galvanized steel, Aluminum-zinc alloy-coated steel Prepainted, metallic-coated steel.
- E. Hatch-Type Heat and Smoke Vents: Galvanized steel, Aluminum-zinc alloy-coated steel or Prepainted, metallic-coated steel].
- F. Gravity Ventilators: Galvanized steel.
- G. Pipe Roof Supports: Extruded-aluminum tube.

- H. Lighting Roof Supports: Epoxy-coated hollow steel pipe.
- I. Light-Duty Pipe Roof Supports: Extruded aluminum.
- J. Duct Roof Supports: Extruded aluminum.
- K. Preformed Flashings: Aluminum.
- L. Finishes:
 - 1. Prepainted, Metallic-Coated Steel: High performance organic coating.
 - 2. Stainless Steel: 2D.
 - 3. Aluminum: Clear anodic or Color anodic.

1.5 FABRICATION

- A. Connections: Welded.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 07720

SECTION 07811 - SPRAYED FIRE-RESISTIVE MATERIALS**1.1 QUALITY ASSURANCE**

- A. Compatibility and adhesion testing.
- B. Mockups for each product indicated.

1.2 WARRANTY

- A. Materials and Workmanship: Two or more years.

1.3 MATERIALS

- A. Concealed SFRM: Cementitious or sprayed-fiber type with dry density not less than 15 lb/cu. ft. (240 kg/cu. m)
- B. Exposed SFRM:
 - 1. Cementitious Type: Dry density not less than 22 lb/cu. ft. (352 kg/cu. m) .
 - 2. Sprayed-Fiber Type: Dry density not less than 22 lb/cu. ft. (352 kg/cu. m).
 - 3. Water-based intumescent mastic.
 - 4. Non-water-based intumescent mastic.
- C. Auxiliary Fire-Resistive Materials:
 - 1. Substrate primers.
 - 2. Bonding adhesive.
 - 3. Expanded metal lath.
 - 4. Reinforcing fabric.
 - 5. Reinforcing mesh.
 - 6. Sealer.
 - 7. Topcoat.

1.4 INSTALLATION

- A. Exposed SFRM Finishes:
 - 1. Cementitious: Sprayed and evenly rolled.
 - 2. Sprayed Fiber: Sprayed with topcoat.
 - 3. Intumescent Mastic: Sprayed and evenly rolled.

1.5 FIELD QUALITY CONTROL

- A. Special Inspections: Company engaged.

- B. Testing Agency: Company engaged.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 07811

SECTION 07841 - THROUGH-PENETRATION FIRESTOP SYSTEMS**1.1 SUMMARY**

- A. Through-penetration firestop systems for penetrations through fire-resistance-rated fire walls, fire partitions, fire barriers, smoke barriers, floors, floor/ceiling assemblies and ceiling membranes of roof/ceiling assemblies.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479 :
 - 1. F-Rated Systems: F-ratings equaling or exceeding fire-resistance rating of constructions penetrated.
 - 2. T-Rated Systems: For penetrations located outside wall cavities and outside fire-resistance-rated shaft enclosures.
 - 3. L-Rated Systems: Where through-penetration firestop systems are indicated in smoke barriers.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A firm approved by FMG according to FMG 4991, "Approval of Firestop Contractors."
- B. Fire-Test-Response Characteristics: Tested per ASTM E 814 by UL.

1.4 MATERIALS

- A. Accessories: Permanent forming/damming/backing materials, temporary forming materials, substrate primers, collars and steel sleeves as needed to comply with performance requirements.

1.5 INSTALLATION

- A. Identification: Preprinted metal or plastic labels, permanently attached.

1.6 FIELD QUALITY CONTROL

- A. Inspection of Installed Firestop Systems: By Owner-engaged agency according to ASTM E 2174 requirements.

- 1.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE – Company to provide UL listed through-penetration firestop systems for all penetrations through walls, floor, ceiling, roof and any combination of, that is identified as a fire and/or smoke rated assembly. All UL listed

firestop penetration systems to be of a compatible assembly and the system best suited for the condition and assembly of penetrated construction, including, but not limited to the following:

- A. Firestop Systems with No Penetrating Items:
- B. Firestop Systems for Metallic Pipes, Conduit, or Tubing:
- C. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing:
- D. Firestop Systems for Electrical Cables:
- E. Firestop Systems for Cable Trays:
- F. Firestop Systems for Insulated Pipes:
- G. Firestop Systems for Miscellaneous Electrical Penetrants:
- H. Firestop Systems for Miscellaneous Mechanical Penetrants:
- I. Firestop Systems for Groupings of Penetrants:

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 07841

SECTION 07842 - FIRE-RESISTIVE JOINT SYSTEMS**1.1 SUMMARY**

- A. Fire-resistive joint systems for the following:
 - 1. Floor-to-floor joints.
 - 2. Floor-to-wall joints.
 - 3. Head-of-wall joints.
 - 4. Wall-to-wall joints.
 - 5. Perimeter fire-resistive joint systems consisting of floor-to-wall joints between perimeter edge of fire-resistance-rated floor assemblies and exterior curtain walls.

1.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings of Joint Systems in and between Fire-Resistance-Rated Constructions: Equaling or exceeding the fire-resistance ratings of construction that they join and with movement capabilities as determined by UL 2079.
- B. Ratings of Perimeter Fire-Resistive Joint Systems: As indicated, determined by UBC Standard 26-9, NFPA 285 and UL 2079.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Tested by UL.

1.4 MATERIALS

- A. Accessories: Forming materials and other components needed to install fill materials.
- B. Floor-to-Floor Fire-Resistive Joint Systems:
 - 1. Assembly Rating: To match wall rating.
 - 2. Joint Width: Typical construction tolerances.
 - 3. Movement Capabilities: Class I
- C. Floor-to-Wall Fire-Resistive Joint Systems:
 - 1. Assembly Rating: To match wall rating.
 - 2. Joint Width: Typical construction tolerances.
 - 3. Movement Capabilities: Class I
- D. Head-of-Wall Fire-Resistive Joint Systems:
 - 1. Assembly Rating: To match wall rating.
 - 2. Joint Width: Typical construction tolerances.
 - 3. Movement Capabilities: Class I

E. Wall-to-Wall Fire-Resistive Joint Systems:

1. Assembly Rating: To match wall rating.
2. Joint Width: Typical construction tolerances.
3. Movement Capabilities: Class I

F. Perimeter Fire-Resistive Joint Systems:

1. UL-Classified Perimeter Fire-Containment Systems:
 - a. Integrity Rating: To match wall assembly rating.
 - b. Insulation Rating: As required by wall assembly rating.
 - c. Linear Opening Width: Typical construction tolerances
 - d. Movement Capabilities: Class I.

1.5 FIELD QUALITY CONTROL

- A. Testing: By Company-engaged agency.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 07842

SECTION 07920 - JOINT SEALANTS**1.1 SUMMARY****A. Exterior Joints in Vertical Surfaces and Horizontal Nontraffic Surfaces:**

1. Construction joints in cast-in-place concrete.
2. Joints between plant-precast architectural concrete units.
3. Control and expansion joints in unit masonry.
4. Joints in exterior insulation and finish systems.
5. Joints between metal panels.
6. Joints between different materials listed above.
7. Perimeter joints around frames of doors, windows and louvers.
Control and expansion joints in ceilings and other overhead surfaces.

B. Exterior Joints in Horizontal Traffic Surfaces:

1. Isolation and contraction joints in cast-in-place concrete slabs.
2. Joints between plant-precast architectural concrete paving units.
3. Joints in stone paving units.
4. Control and expansion joints in tile.
5. Joints between different materials listed above.

C. Interior Joints in Vertical Surfaces and Horizontal Nontraffic Surfaces:

1. Control and expansion joints on exposed interior surfaces of exterior walls.
2. Perimeter joints of exterior openings.
3. Control and expansion joints in tile.
4. Vertical joints on exposed surfaces of interior unit masonry, concrete, walls and partitions.
5. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
6. Joints between plumbing fixtures and adjoining walls, floors, and counters.

D. Interior Joints in Horizontal Traffic Surfaces:

1. Isolation joints in cast-in-place concrete slabs.
2. Control and expansion joints in tile flooring.

1.2 QUALITY ASSURANCE

- A. Preconstruction compatibility and adhesion testing.
- B. Product testing.
- C. Preconstruction field-adhesion testing.
- D. Mockups.

1.3 WARRANTY

- A. Installer: Two (2) years.
- B. Manufacturer: Ten (10) years minimum.

1.4 MATERIALS

- A. Elastomeric Joint Sealants: Liquid applied, chemically curing; ASTM C 920.
 - 1. Nonsag, pourable, polysulfide sealants.
 - 2. Pourable neutral-curing silicone sealants.
 - 3. Nonsag neutral- and basic-curing silicone sealants.
 - 4. Acid-curing silicone sealants.
 - 5. Mildew-resistant neutral-curing silicone sealants.
 - 6. Nonsag, pourable urethane sealants.
- B. Solvent-Release Joint Sealants: Acrylic, Butyl rubber, Pigmented narrow joint.
- C. Latex Joint Sealants: ASTM C 834, Type P, Grade NF.
- D. Acoustical Joint Sealants: Latex and Synthetic rubber
- E. Preformed Joint Sealants: Silicone-sealant system and Foam sealant].
- F. Preformed Tape Sealants: Back-bedding mastic, butyl based and Expanded cellular.
- G. Joint-Sealant Backing: Cylindrical, Elastomeric tubing and Bond-breaker tape.

1.5 FIELD QUALITY CONTROL

- A. Field-adhesion testing for sealant adhesion to joint substrates.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 07920

SECTION 08110 - STEEL DOORS AND FRAMES**1.1 SUMMARY**

- A. Standard hollow metal doors and frames.

1.2 QUALITY ASSURANCE

- A. Standard Hollow Metal Quality Standard: ANSI/SDI A250.8.
- B. Custom Hollow Metal Quality Standard: ANSI/NAAMM-HMMA 861.
- C. Fire-Rated Doors and Frames: Positive-pressure testing.

1.3 PRODUCTS

- A. Standard Hollow Metal Doors:

- 1. Design Wind Loads: All provisions of the Florida Building Code and the requirements of Miami-Dade wind borne debris regions shall apply.
- 2. Thermal-Rated Doors: Exterior and interior where indicated.
- 3. Exterior Doors: Metallic-coated steel sheet faces.
 - a. Level 2 and Physical Performance Level B (Heavy Duty), 3 and Physical Performance Level A (Extra Heavy Duty).
 - b. Model: 1 (Full Flush).
- 4. Interior Doors: Cold-rolled steel sheet faces [**unless metallic-coated sheet is indicated**].
 - a. Level 1 and Physical Performance Level C (Standard Duty) 2 and Physical Performance Level B (Heavy Duty).
 - b. Model: 1 (Full Flush).

- B. Standard Hollow Metal Frames:

- 1. Exterior Frames: Metallic-coated steel sheet; full profile welded.
 - a. Frames for Level 1 Steel Doors: 0.042-inch- (1.0-mm-) thick steel sheet.
 - b. Frames for Level 2 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
 - c. Frames for Level 3 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
 - d. Frames for Level 4 Steel Doors: 0.067-inch- (1.7-mm-) thick steel sheet.
- 2. Interior Frames: Cold-rolled steel sheet; full profile welded.
 - a. Frames for Level 1 Steel Doors: 0.042-inch- (1.0-mm-) thick steel sheet.
 - b. Frames for Level 2 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
 - c. Frames for Level 3 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
 - d. Frames for Level 4 Steel Doors: 0.067-inch- (1.7-mm-) thick steel sheet.

- C. Hollow Metal Panels: Same materials, construction, and finish as adjoining hollow metal work.
- D. Accessories:
 - 1. Moldings and stops for glazed lites.
 - 2. Terminated (hospital) stops.
 - 3. Louvers: Sightproof, steel.
- E. Finishes: Factory-applied paint.

1.4 INSTALLATION

- A. Metal-Stud Partitions: Frames filled with insulation.
- B. Concrete and Masonry Walls: Frames filled with grout.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 08110

SECTION 08125 - INTERIOR ALUMINUM FRAMES

1.1 SUMMARY

- A. Interior aluminum frames for glazing.

1.2 QUALITY ASSURANCE

- A. Fire-Rated Door Frames: As scheduled on Drawings.

1.3 COMPONENTS

- A. Aluminum Framing and Trim: Extruded aluminum, not less than 0.062 inch (1.6 mm) thick.
- B. Aluminum Finishes: Class II, color anodic finish.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 08125

SECTION 08331 - OVERHEAD COILING DOORS**1.1 SUMMARY**

- A. Electric-motor-operated overhead coiling doors:
 - 1. Service doors.
 - 2. Insulated service doors.

1.2 PERFORMANCE REQUIREMENTS

- A. Design Wind Loads: All provisions of the Florida Building Code and the requirements of Miami-Dade wind borne debris regions shall apply.
- B. Operation Cycles: 10,000.

1.3 QUALITY ASSURANCE

- A. Fire-Rated Door Assembly Standard: NFPA 80.

1.4 COMPONENTS

- A. Door Curtain: Galvanized steel.
 - 1. Slats: Flush
 - 2. Insulation: Polystyrene or polyurethane foam with steel inside curtain face.
 - 3. Endlocks.
 - 4. Curtain jamb guides.
- B. Hood: Galvanized steel.
- A. Integral Frame, Hood, and Fascia for Counter Doors: Galvanized steel.
- B. Integral sills.
- C. Fire-rated counter.
- D. Seals: Weather.
- E. Automatic Closing Device: Activated by governor.
- F. Manual Door Operation: Chain-hoist operator.
- G. Electric Door Operation: Gear-head type, with momentary-contact remote-control station.
 - 1. Obstruction Detection Device: Photoelectric.
 - 2. ADA-compliant audible alarm and visual indicator lights.

3. Radio control.

H. Finishes:

1. Steel and Galvanized Steel: [**Factory primer for field**] [**Baked**] [**Powder-coat**] finish.

2.0 SUBMITTALS

A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

B. Company to submit product control approval.

END OF SECTION 08331

SECTION 08346 - SOUND-CONTROL DOOR ASSEMBLIES**1.1 SUMMARY**

- A. Sound-control door assemblies consisting of swinging steel doors, steel frames, and sound-control seals.

1.2 PERFORMANCE REQUIREMENTS

- A. Sound Rating: STC 45 minimum or as required by Building Code.

1.3 WARRANTY

- A. Materials and Workmanship for Steel Doors: Five (5) years minimum.
- B. Materials and Workmanship for Wood Doors: Two (2) years minimum.

1.4 PRODUCTS

- A. Steel Doors: Flush design, 1-3/4 inches (44 mm) thick.
 - 1. Exterior Door Face Sheets: 0.042-inch- (1.0-mm-) thick, metallic-coated steel sheet.
 - 2. Interior Door Face Sheets: 0.042-inch- (1.0-mm-) thick, cold-rolled steel sheet.
- B. Sound-control panels to match door construction.
- C. Steel Frames: Full-welded unit construction.
 - 1. Exterior Frames: 0.067-inch- (1.7-mm-) thick, metallic-coated steel sheet.
 - 2. Interior Frames: 0.067-inch- (1.7-mm-) thick, cold-rolled steel sheet.
 - 3. Ceiling struts.
 - 4. Plaster guards.
- D. Door Hardware: Sound-control system, including head and jamb seals, door bottoms, cam-lift hinges, and thresholds, as required by testing to achieve STC rating.
 - 1. Thresholds: Aluminum.
- E. Glazing: Factory installed.
- F. Steel Finishes: Factory priming for field-painted finish.

1.5 FIELD QUALITY CONTROL

- A. Acoustical Testing Agency: Contractor engaged to perform field testing of installed assemblies to verify STC rating.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 08346

SECTION 08411 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS**1.1 SUMMARY**

- A. Exterior and interior aluminum-framed storefronts with glazing that is retained mechanically with gaskets on four sides.
- B. Exterior and interior manual-swing aluminum doors.
- C. Exterior and interior aluminum door frames.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance:
 - 1. Design Wind Loads: All provisions of the Florida Building Code and the requirements of Miami-Dade wind borne debris regions shall apply.
- B. Windborne-Debris-Impact Resistance: Large missile impact for exterior only.

1.3 QUALITY ASSURANCE

- A. Preconstruction sealant testing for structural-sealant-glazed systems.
- B. Mockups for each form of construction.
- C. Company to engineer aluminum-framed systems to comply with performance requirements.

1.4 WARRANTY

- A. Assembly Warranty: Five (5) years minimum.
- B. Finish Warranty: Twenty (20) years.

1.5 COMPONENTS

- A. Framing Systems: Aluminum with steel reinforcement as determined by designated engineer.
 - 1. Construction: One-piece members internally slotted at regular intervals.
- B. Glazing Systems:
 - 1. Glazing: Specified in Division 8 Section "Glazing."
 - 2. Structural Sealant: Neutral-curing silicone.
 - 3. Weatherseal Sealant: Neutral-curing silicone.

C. Doors: 1-3/4-inch (44.5-mm) overall thickness.

1. Door Design: Narrow stile.

D. Door Hardware: As scheduled.

E. Field-installed insulating materials.

F. Aluminum Finishes: Class II, color anodic.

1.6 SOURCE QUALITY CONTROL

A. Structural-Sealant-Glazed Systems: Tested and inspected by manufacturer according to ASTM C 1401.

1.7 FIELD QUALITY CONTROL

A. Testing Agency: Company engaged.

B. Testing Services:

1. Structural-Sealant Compatibility and Adhesion: ASTM C 1401.
2. Structural-Sealant Glazing Inspection: ASTM C 1401.
3. Air Infiltration: ASTM E 783.
4. Water Penetration: ASTM E 1105 at uniform static-air-pressure difference.
5. Water Spray Test: AAMA 501.2.

1.8 DOOR HARDWARE SCHEDULE

A. Refer to Door Schedule

2.0 SUBMITTALS

A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 08411

SECTION 08520 - ALUMINUM WINDOWS**1.1 PERFORMANCE REQUIREMENTS**

- A. Engineering design of aluminum windows by Company.
- B. Design Wind Loads: All provisions of the Florida Building Code and the requirements of Miami-Dade wind borne debris regions shall apply..
- C. Importance Factor: [I] [II] [III] [IV].
- D. Exposure Category: [A] [B] [C] [D].
- E. Windborne-Debris Resistance: Per ASTM E 1886 and testing information in ASTM E 1996 or AAMA 506.

1.2 QUALITY ASSURANCE

- A. Quality Standard: AAMA/WDMA 101/I.S.2/NAFS.
- B. Mockups for each form of construction.

1.3 WARRANTY

- A. Windows: Three (3) years minimum.
- B. Glazing: Refer to Section 8 Glazing.
- C. Metal Finish: Twenty (20) years.

1.4 WINDOWS

- A. Type: Fixed.
 - 1. Performance Class and Grade: R[15] [20] [25] <Insert grade>.
 - 2. Performance Class and Grade: LC[25] [30] [35] <Insert grade>.
 - 3. Performance Class and Grade: C[30] [35] [40] <Insert grade>.
 - 4. Performance Class and Grade: HC[40] [45] [50] <Insert grade>.
 - 5. Performance Class and Grade: AW[40] [45] [50] <Insert grade>.
 - 6. Performance Class and Grade: As indicated.
- B. Condensation-Resistance Factor: [45] [52] <Insert value>.
- C. U-Factor: As determined by LEED Energy Model Calculations.
- D. Solar Heat-Gain Coefficient: As determined by LEED Energy Model Calculations.

- E. Sound Transmission Class: 26.
- F. Forced-Entry Resistance: Performance Grade **[10] [20] [30] [40]**.
- G. Glazing: Factory glazed.
 - 1. Glass: Bronze, insulation and E-coating to meet LEED Criteria
 - 2. Glazing System: [**Manufacturer's standard**] <Insert requirements>.
- H. Hardware: Aluminum, where exposed.
- I. Finishes: Class II, color anodic.

1.5 FIELD QUALITY CONTROL

- A. Testing: By Company-engaged agency.

1.6 DEMONSTRATION

- A. Factory-authorized representative to demonstrate window operating system.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 08520

SECTION 08630 - METAL-FRAMED SKYLIGHTS**1.1 SUMMARY****A. Aluminum-Framed Skylights:**

1. Glazing: Glass.
2. Glazing Retained: By factory-installed structural sealant on four sides.

1.2 QUALITY ASSURANCE**A. Performance testing of manufacturer's standard assemblies by a qualified independent testing agency.**

1. Testing: By Company-engaged agency.

B. Mockups for each form of construction and finish.**C. Company to engineer skylights to comply with performance requirements.****1.3 WARRANTY****A. Assembly: Five (5) years minimum.****B. Finish: Twenty (20) years.****1.4 MATERIALS****A. Glazing: Factory glazed.****B. Aluminum Finishes: Class II, color anodic.****1.5 SOURCE QUALITY CONTROL****A. Structural-Sealant Glazing: Material qualification, sealant testing, and fabrication reviews and checks.****1.6 FIELD QUALITY CONTROL****A. Testing and Inspecting: By Company-engaged agency.****B. Structural-sealant compatibility and adhesion testing.****C. Structural-sealant glazing inspection.**

- D. Water penetration under static-pressure test.
- E. Water-spray test.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 08630

SECTION 08710 - DOOR HARDWARE**1.1 SUMMARY**

- A. Commercial door hardware for swinging doors.
- B. Cylinders for doors specified in other Sections.

1.2 WARRANTY

- A. Materials and Workmanship: Three (3) years.

1.3 PRODUCTS

- A. **Hinges and Spring Hinges:**
 - 1. Exterior: Stainless steel.
 - 2. Interior: Steel.
 - 3. Fire-Rated Assemblies: Steel.
- B. Mechanical Locks and Latches: See Door and Hardware Schedule in Drawing
- C. Stand-alone exit alarms connected to remote panel.
- D. Door Bolts: See Door and Hardware Schedule in Drawing.
- E. Exit Devices: See Door and Hardware Schedule in Drawing Panic exit devices.
- F. Cylinders and Keying:
 - 1. Cylinders: See Door and Hardware Schedule in Drawing
 - 2. Construction Keying: Construction [**master keys**] [**cores**].
 - 3. Keying System: To be determined by DBO.
- G. Key-Control System: To be determined by DBO.
- H. Key lock boxes.
- I. Operating Trim: Aluminum.
- J. Carry-open bars for pairs of doors.
- K. Closers: See Door and Hardware Schedule in Drawing
- L. Protective Trim Units: Aluminum.

- M. Stops and Holders: See Door and Hardware Schedule in Drawing
- N. Door Gasketing: As per manufacturer's product approval.
- O. Thresholds.

1.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: **[Owner]** **[Company]** engaged to perform inspections.
- B. Occupancy Adjustment: **[Three]** **[Six]** **<Insert number>** months.

1.5 DOOR HARDWARE SETS

- A. **<Insert requirements for door hardware sets for each type of door opening; e.g., offices, entrances, etc.>**

END OF SECTION 08710

SECTION 08800 - GLAZING**1.1 SUMMARY****A. Glazing required for the following:**

1. Windows.
2. Doors.
3. Glazed curtain walls.
4. Glazed entrances.
5. Interior borrowed lites.
6. Storefront framing.
7. Skylights.

1.2 QUALITY ASSURANCE

- A. Preconstruction adhesion and compatibility testing.
- B. Mockups for each glass product.

1.3 WARRANTY

- A. Deterioration of Coated Glass: Not less than Ten (10) years.
- B. Deterioration of Laminated Glass: Not less than Five (5) years.
- C. Deterioration of Insulating Glass: Not less than Ten (10) years.

1.4 MATERIALS**A. Glass Products:**

1. Annealed Float Glass: Tinted.
2. Heat-Treated Float Glass: Heat strengthened.
3. Ceramic-Coated Float Glass: Vision.
4. Coated Float Glass: Pyrolytically coated.
5. Laminated Glass: With 30 mil. Minimum polyvinyl-butyl sheet interlayer.
6. Insulating Glass: Manufacturer's standard dual-seal units.

- B. Fire-Resistive Glazing: Laminated glass with intumescent interlayers.
- C. Silicone Glazing Sealants: Neutral or basic curing.
- D. Glazing Tapes: Expanded-cellular type.
- E. Glazing Gaskets: Dense compression.

1.5 GLASS UNITS

- A. Monolithic Float-Glass Units:
- B. Monolithic Ceramic-Coated Vision-Glass Units:
- C. Laminated-Glass Units:
- D. Insulating-Glass Units:

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 08800

SECTION 08830 - MIRRORS**1.1 SUMMARY**

- A. Annealed monolithic glass mirrors.
- B. Laminated safety mirrors.

1.2 QUALITY ASSURANCE

- A. Safety Glass: Category II materials per 16 CFR 1201.
- B. Preconstruction mirror mastic compatibility test.

1.3 WARRANTY

- A. Mirror Backing: Five (5) years against deterioration.

1.4 PRODUCTS

- A. Tempered Clear Glass Mirrors: Comply with ASTM C 1503, Mirror Glazing Quality, and with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied.
 - 1. Nominal Thickness: 6.0 mm.
 - 2. Tint Color: Clear.
- B. Annealed Float Glass for Inner Lite of Laminated Mirrors: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; Class 1 (clear).
- C. Miscellaneous Materials:
 - 1. Setting blocks.
 - 2. Edge sealer.
 - 3. Mirror mastic.
- D. Mirror Hardware:
 - 1. Top and bottom aluminum J-channels.
 - 2. Mirror bottom and top clips.

1.5 FABRICATION

- A. Mirror Sizes: Before tempering, cut mirrors to final sizes and shapes.
- B. Cutouts: Before tempering, fabricate cutouts for notches and holes in mirrors.

C. Mirror Edge Treatment: Flat polished edge.

1. Seal edges of mirrors after edge treatment.

1.6 INSTALLATION

A. Wall Installation Method: Install mirrors with mastic and mirror hardware.

2.0 SUBMITTALS

A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 08830

SECTION 08911 - GLAZED ALUMINUM CURTAIN WALLS**1.1 SUMMARY**

- A. Conventionally glazed aluminum curtain walls installed as outside glazed structurally silicon glazed curtain wall system.

1.2 PERFORMANCE REQUIREMENTS

- A. Wind Loads: All provisions of the Florida Building Code and the requirements of Miami-Dade wind borne debris regions shall apply.
- B. Periodic Maintenance-Equipment Loads: Consult manufacturer for equipment loads
- C. Sound Transmission: Minimum STC 32 according to ASTM E 413 and an OITC 26 according to ASTM E 1332.

1.3 QUALITY ASSURANCE

- A. Preconstruction Testing Service: Company engaged.
- B. Mockups for each form of construction.
- C. Company to engineer glazed aluminum curtain-wall systems to comply with performance requirements.

1.4 WARRANTY

- A. Assembly Warranty: Five (5) years minimum.
- B. Finish Warranty: Twenty (20) years.

1.5 COMPONENTS

- A. Framing Systems: Aluminum with steel reinforcement, as required.
- B. Glazing Systems:
 - 1. Glazing: Specified in Division 8 Section "Glazing."
 - 2. Gaskets: Specified in Division 8 Section "Glazing."
 - 3. Glazing Sealants: Specified in Division 8 Section "Glazing"
- C. Insulated spandrel panels, with aluminum exterior skin and thermal insulation core.
- D. Accessories:

- E. Aluminum Finishes: Class II, color anodic.

1.6 FABRICATION

- A. Provisions for field replacement of glazing from exterior.

1.7 FIELD QUALITY CONTROL

- A. Testing Agency: Company engaged.
- B. Testing Services:
 - 1. Air Infiltration: ASTM E 783.
 - 2. Water Penetration: ASTM E 1105.
 - 3. Water Spray Test: AAMA 501.2

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 08911

SECTION 09111 - NON-LOAD-BEARING STEEL FRAMING**1.1 SUMMARY**

- A. Non-load-bearing steel framing members for interior framing and suspension systems.

1.2 MATERIALS

- A. Suspension Systems:

- 1. Wire hangers.
 - 2. Flat hangers.
 - 3. Carrying channels.
 - 4. Furring channels.
 - 5. Grid suspension systems for ceilings.

- B. Steel Framing for Framed Assemblies:

- 1. Studs and runners.
 - 2. Slip-Type Head Joints:
 - a. Single long-leg runner.
 - b. Double runner.
 - c. Deflection track.
 - 3. Firestop track.
 - 4. Flat strap and backing plate.
 - 5. Cold-rolled channel bridging.
 - 6. Hat-shaped, rigid furring channels.
 - 7. Resilient furring channels.
 - 8. Cold-rolled furring channels.
 - 9. Z-shaped furring.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 09111

SECTION 09250 - GYPSUM BOARD**1.1 SUMMARY**

- A. Interior gypsum board.
- B. Exterior gypsum board for ceilings and soffits.
- C. Tile backing panels.

1.2 QUALITY ASSURANCE

- A. Mockups for the following:
 - 1. Levels of gypsum board finish for use in exposed locations.
 - 2. Texture finishes.

1.3 MATERIALS

- A. Interior Gypsum Board:
 - 1. Regular type.
 - 2. Type X.
 - 3. Special Type X: Having improved fire resistance over standard Type X.
 - 4. Flexible Type: Manufactured to bend to fit radii.
 - 5. Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board.
 - 6. Foil-backed type.
 - 7. Abuse-resistant type.
 - 8. Moisture- and mold-resistant type.
- B. Exterior Gypsum Board for Ceilings and Soffits:
 - 1. Exterior gypsum soffit board.
 - 2. Glass-mat gypsum sheathing board.
- C. Tile-Backing Panels:
 - 1. Water-resistant gypsum backing board.
 - 2. Glass-mat, water-resistant backing board.
 - 3. Cementitious backer units.
- D. Trim Accessories:
 - 1. Interior.
 - 2. Exterior.
 - 3. Aluminum: Extruded profiles.

- E. Texture finishes.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 09250

SECTION 09265 - GYPSUM BOARD SHAFT-WALL ASSEMBLIES**1.1 SUMMARY**

- A. Shaft-wall enclosures.
- B. Chase enclosures.
- C. Stair enclosures.
- D. Horizontal enclosures.

1.2 MATERIALS**A. Panel Products:**

- 1. Gypsum liner panels, Type X and moisture- and mold-resistant Type X.
- 2. Gypsum base for gypsum veneer plaster.
- 3. Gypsum board.
- 4. Water-resistant gypsum backing board.
- 5. Cementitious backer units.

B. Non-Load-Bearing Steel Framing:

- 1. Framing Members: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized, unless otherwise indicated.

C. Auxiliary Materials:

- 1. Trim accessories.
- 2. Gypsum base and board joint-reinforcing materials.
- 3. Gypsum veneer plaster.
- 4. Laminating adhesive, VOC content of 50 g/L or less
- 5. Steel drill screws.
- 6. Track fasteners.
- 7. Sound attenuation blankets.
- 8. Acoustical sealant.

1.3 GYPSUM BOARD SHAFT-WALL

- A. Fire-Resistance Rating: As indicated in drawings.
- B. STC Rating: As indicated in drawings.
- C. Stud Depth: 2-1/2 inches (64 mm) unless otherwise noted in drawings.
- D. Runner Tracks: Manufacturer's standard J-profile track.

- E. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated.
- F. Jamb Struts: Manufacturer's standard J-profile strut.
- G. Room-Side Finish: Gypsum board or Cementitious backer units.
- H. Shaft-Side Finish: Gypsum board or As indicated by fire-resistance-rated assembly design designation.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 09265

SECTION 09310 - CERAMIC TILE**1.1 SUMMARY**

- A. Glazed wall tile.
- B. Solid polymer thresholds installed as part of tile installations.
- C. Waterproof membrane for thin-set or adhesive tile installations.
- D. Crack-suppression membrane for thin-set tile installations.
- E. Cementitious backer units installed as part of tile installations.
- F. Metal edge strips installed as part of tile installations.

1.2 QUALITY ASSURANCE

- A. Mockups for each form of construction.

1.3 MATERIALS

- A. Glazed Wall Tile Trim Shapes: Coved base and external and internal corner.
- B. Thresholds: Solid polymer.
- C. Waterproofing: Urethane waterproofing and tile-setting adhesive.
- D. Crack-Suppression Membranes: Urethane waterproofing and tile-setting adhesive.
- E. Elastomeric Sealants: One-part, mildew-resistant silicone.

1.4 FLOOR TILE INSTALLATION SCHEDULE

- A. Interior Floors on Concrete: Cement mortar bed bonded to concrete.
 - 1. Tile Type: Porcelain tile.
 - 2. Mortar: [**Dry-set**] [**Latex-**] portland cement mortar bond coat.
 - 3. Grout: [**Sand-portland cement**] [**Standard sanded cement**] [**Standard unsanded cement**] [**Polymer-modified sanded**] [**Polymer-modified unsanded**] grout.

1.5 WALL TILE INSTALLATION SCHEDULE

- A. Interior Walls over Gypsum Board on Metal Studs: Organic adhesive.
 - 1. Tile Type: Glazed wall tile.

2. Grout: [**Sand-portland cement**] [**Standard sanded cement**] [**Standard unsanded cement**] [**Polymer-modified sanded**] [**Polymer-modified unsanded**] grout.
- B. Interior Walls and Shower-Receptors over [**Cementitious Backer Units**] [**Glass-Mat, Water-resistant Backer Board**]: Thin-set mortar.
1. Tile Type: [**Unglazed ceramic mosaic**] [**Glazed ceramic mosaic**] [**Glazed wall**] tile.
 2. Mortar: [**Dry-set**] [**Latex-**] portland cement mortar.
 3. Grout: [**Sand-portland cement**] [**Standard sanded cement**] [**Standard unsanded cement**] [**Polymer-modified sanded**] [**Polymer-modified unsanded**] grout.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 09310

SECTION 09511 - ACOUSTICAL PANEL CEILINGS**1.1 SUMMARY**

- A. Acoustical panels and exposed suspension systems.

1.2 QUALITY ASSURANCE

- A. Acoustical Panel Quality Standard: ASTM E 1264.
- B. Metal Suspension System Quality Standard: ASTM C 635.
- C. Mockups for each form of construction.

1.3 MATERIALS

- A. Acoustical Ceiling Panels:
 - 1. Pre-formed mineral fiber with factory applied latex , white with light reflective finish of CR .90 minimum.
- B. Metal Suspension Systems:
 - 1. Wire hangers, braces, and ties.
 - 2. Hanger rods and Flat hangers.
 - 3. Angle hangers.
 - 4. Seismic perimeter stabilizer bars, struts, and clips.
 - 5. Hold-down clips.
 - 6. Impact clips.
 - 7. Clean-room gasket system.
 - 8. Wide-Face, Capped, Double-Web, Steel: Intermediate duty.
 - 9. Narrow-Face, Capped, Double-Web Steel: Intermediate duty
 - 10. Narrow-Face, Steel-Capped, Double-Web, Fire-Rated Steel: Intermediate duty.
 - 11. Narrow-Face, Uncapped, Double-Web Steel: Intermediate duty.
 - 12. Wide-Face, Capped, Double-Web, Hot-Dip Galvanized Steel: Intermediate duty.
 - 13. Wide-Face, Single-Web Steel: Heavy duty.
 - 14. Wide-Face, Capped, Double-Web, Stainless Steel: Intermediate duty.
 - 15. Narrow-Face, Single-Web, Extruded Aluminum: Intermediate duty.
 - 16. Extra-Wide-Face, Single-Web, Extruded Aluminum: Intermediate duty.
- C. Metal Edge Moldings and Trim: Extruded aluminum.
- D. Acoustical sealants.

1.4 INSTALLATION

- A. Installation: [ASTM C 636] [UBC Standard 25-2].

1.5 FIELD QUALITY CONTROL

- A. Testing: By Company-engaged agency to test acoustical panel ceiling hanger fasteners.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 09511

SECTION 09512 - ACOUSTICAL TILE CEILINGS**1.1 SUMMARY**

- A. Acoustical tiles and concealed suspension systems.

1.2 QUALITY ASSURANCE

- A. Acoustical Tile Quality Standard: ASTM E 1264.
- B. Metal Suspension System Quality Standard: ASTM C 635.
- C. Mockups for each form of construction.

1.3 MATERIALS

- A. Acoustical Ceiling Tiles:
 - 1. Wet-formed mineral fiber with acoustically transparent membrane and factory applied latex paint.
- B. Metal Suspension Systems:
 - 1. Wire hangers, braces, and ties.
 - 2. Hanger rods.
 - 3. Angle hangers.
 - 4. Seismic struts and clips.
 - 5. Direct Hung, Double Web, Intermediate duty; with upward and end- or side-pivoted access.
 - 6. Indirect Hung: Intermediate duty.
- C. Metal Edge Moldings and Trim: Extruded aluminum.
- D. Acoustical sealants.

1.4 INSTALLATION

- A. Installation: ASTM C 636.

1.5 FIELD QUALITY CONTROL

- A. Testing: By Company-engaged agency to test acoustical tile ceiling hanger fasteners.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 09512

SECTION 09650 - RESILIENT FLOOR, WALL BASE AND ACCESSORIES**1.1 PRODUCTS****A. Floor Coverings:**

1. Floor Tile: Manufacturer's standard.
2. Sheet Flooring: In manufacturer's standard length by not less than 78 inches (1980 mm) wide.
3. Seaming Method: Manufacture's standard.
4. Thickness: 0.13 inch (3.2 mm).

B. Resilient Base:

1. Material Requirement: Rubber.
2. Style: Straight.
3. Minimum Thickness: 3/8" or 1/8" - as indicated on Drawings.
4. Outside Corners: Preformed.
5. Inside Corners: Preformed.

C. Resilient Molding Accessory: Rubber.

1. Cap for cove carpet.
2. Cap for cove resilient floor covering.
3. Carpet bar for tackless installations.
4. Carpet edge for glue-down applications.
5. Nosing for carpet.
6. Nosing for resilient floor covering.
7. Reducer strip for resilient floor covering.
8. Joiner for tile and carpet.
9. Transition strips.

D. Installation Materials:

1. Trowelable leveling and patching compounds.
2. Adhesives.
3. Stair-tread-nose filler.
4. Metal edge strips.
5. Floor polish.

Z**2.0 SUBMITTALS**

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 09650

SECTION 09681 - CARPET TILE**1.1 QUALITY ASSURANCE**

- A. Mockups for each type of carpet tile installation.
- B. Products comply with requirements of CRI's Green Label Indoor Air Quality Testing Program.

1.2 WARRANTY

- A. Carpet Tile: **[10]** years.

1.3 MATERIALS

- A. Carpet Tile <See drawing A-020 for Room Schedule and Finish schedule>:

- 1. Fiber Content: **[100 percent nylon 6, 6] [100 percent nylon 6] [100 percent polypropylene] [100 percent wool] [80 percent wool; 20 percent nylon 6, 6] [80 percent wool; 20 percent nylon 6]** <Insert fiber and content by percentage.>
- 2. Pile Characteristic: **[Level-loop] [Cut] [Cut-and-loop]** pile.
- 3. Density: <Insert **oz./cu. yd. (g/cu. cm).**>
- 4. Pile Thickness: <Insert **inches (mm).**>
- 5. Surface Pile Weight: <Insert **oz./sq. yd. (g/sq. m).**>
- 6. Total Weight: <Insert **oz./sq. yd. (g/sq. m).**>
- 7. Size: **[18 by 18 inches (457 by 457 mm)] [24 by 24 inches (610 by 610 mm)] [18 by 36 inches (457 by 914 mm)] [36 by 36 inches (914 by 914 mm)]** <Insert dimension>.

1.4 INSTALLATION

- A. Installation Method: **[Glue down with releasable] [Partial glue down with releasable] [Free lay without]** adhesive.

END OF SECTION 09681

SECTION 09905

PAINTING AND PROTECTIVE COATINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide all labor, materials, apparatus, scaffolding, and all appurtenant work in connection with painting and protective coatings, complete as indicated, specified and required.
- B. Principal items include, but are not limited to:
 - 1. All exposed piping, conduits, tanks, equipment and other metal surfaces, interior and exterior, except as hereinafter specifically excluded.
 - 2. All structural and miscellaneous steel.
 - 3. Equipment furnished without factory finished surfaces.
 - 4. Any equipment on which factory applied finishes have been marred, abraded, scratched, nicked, or otherwise damaged.
 - 5. The interior and exterior of concrete, manholes, and similar structures, except drainage structures.
 - 6. CMU and drywall surfaces, and other building work as specified and shown on the drawings.
- C. The following surfaces, in general, shall not be field painted:
 - 1. Concrete surfaces subject to pedestrian or vehicular traffic, except as herein specified.
 - 2. Nonferrous metals and stainless steel (including Super Duplex 20 pipe) unless otherwise noted or indicated. Galvanized steel shall not be considered as a nonferrous metal.
 - 3. Mechanical equipment and prefabricated roof and side panels, gutters and downspouts with factory finish as specified herein.
 - 4. Electrical and instrumentation equipment with approved factory finish or of stainless steel/nonferrous metal construction, unless otherwise specified.
 - 5. Chainlink fencing and gates.
 - 6. Fiberglass or aluminum doors and frames.
 - 7. Drainage structures.
- D. Related work not included in this Section:

1. Sealants and Caulking, Section 07900.

1.02 GUARANTEE

- A. A three (3) year guarantee against failure which commences on the date of final completion shall be provided for all coatings, unless more stringent requirements are specified hereinafter. Failure of any coating during the guarantee period shall be repaired by the Company who shall absorb all costs related to the repair of the coating. Failure shall be defined as peeling, blistering, delamination or loss of adhesion of any of the coatings.

1.03 REFERENCE SPECIFICATIONS AND STANDARDS

- A. Without limiting the generality of other requirements of these specifications, all cleaning, surface preparation, and coating shall conform to the applicable requirements of the referenced portions of the standards specified herein to the extent that the requirements therein specified are not in conflict with the provisions of this Section.
- B. Unless otherwise specified, all work and materials for the preparation and coating of all metal surfaces shall conform to the applicable requirements specified in the Steel Structures Painting Manual, Volume 2, Systems and Specifications Revised, latest edition, published by the Steel Structures Painting Council.
- C. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this Section.
 - 1. White Metal Blast Cleaning (SSPC-SP5). Removal of all visible rust, mill scale, paint, and foreign matter by blast cleaning by wheel or nozzle (dry) using sand, grit, or shot. (For very corrosive atmosphere.)
 - 2. Near-White Blast Cleaning (SSPC-SP10). Blast cleaning nearly to White Metal Cleanliness, until at least 95 percent of each element of surface area is free of all visible residues. (For high humidity, chemical atmosphere, marine or other corrosive environment.)
 - 3. Commercial Blast (SSPC-SP6). Blast cleaning until at least 67 percent of each element of surface area is free of all visible residues.
 - 4. Brush-Off Blast Cleaning (SSPC-SP7). Blast cleaning of all except tightly adhering residues of mill scale, rust and coatings, exposing numerous evenly distributed flecks of underlying metal.
 - 5. Solvent Cleaning (SSPC-SP1). Removal of oil, grease, dirt, soil, salts, and contaminants by cleaning with solvent, vapor, alkali, emulsion or steam.
 - 6. Hand Tool Cleaning (SSPC-SP2). Removal of all rust scale, mill scale, loose rust and loose paint to the degree specified by hand wire brushing, hand sanding, hand scraping, hand chipping or other hand impact tools or by a combination of these methods. The substrate should have a faint metallic sheen and also be free of oil, grease, dust, soil, salts, and other contaminants.
 - 7. Power Tool Cleaning (SSPC-SP3). Removal of all rust scale, mill scale, loose paint and loose rust to the degree specified by power wire brushes, power impact tools, power grinders, power sanders, or by a combination of these methods. The substrate should

have a pronounced metallic sheen and also be free of oil, grease, dirt, soil, salts, and other contaminants. Surface should not be buffed or polished smooth.

- D. Quality Assurance. Evaluation of surface preparation for ferrous metals will be based upon NACE Standard TM-01-Visual Standard for Surface Preparation.

1.04 SUBMITTALS. Submittals shall be in accordance with Appendix 5 of the Service Contract and the following:

A. Samples.

1. Prepare and submit for City Engineer's approval six (6) copies of color samples on 8-1/2" x 11" size cards for each paint and protective coating system. Each sample card shall clearly show each coat of the finish system, and shall be clearly marked with the manufacturer's name and product identification, and shall be submitted in sufficient time to allow for approval and, if necessary, resubmittal without causing any delay of the project.

B. Coating Materials List.

1. The Company shall provide six (6) copies of a paint and coating materials list which indicates the manufacturer and paint number, keyed to the coating schedule herein, prior to or at the time of submittal of samples required herein.
2. The Company shall include with his submittal, his protective coating schedule for shop and field coatings of items to receive protection. The schedule shall conform to the specified requirements for surface preparation, priming, and coating for items covered, and shall follow the same requirements for similar work where such work has not been specifically called-out. No bare ferrous nonworking surfaces shall be omitted from the schedule. Particular care shall be taken to cover in sufficient detail the coating of mechanical joints and other mechanical devices which shall conform to the recommended practice of the manufacturer of the joint or other mechanical devices.
3. Submittal shall be within 60 calendar days of notice of award to permit City Engineer's review and then Company's coordination with affected material and equipment suppliers to assure their use of approved shop coats of same manufacture as field coats and compatibility with field applied coats for respective coating systems.
4. Coatings to be used on plastic and fiberglass materials shall be certified as acceptable by all plastic and fiberglass manufacturers whose products are to be coated. Certification copies shall be submitted to the City Engineer. The Company shall be certified in writing by the painting and coating material manufacturers as qualified applicators of their products with copies of the certification submitted to the City Engineer.

- C. Product Data Sheets. Company shall submit paint and coatings material manufacturers' printed technical data sheets for products intended for use in each paint and coating system. Data sheets shall fully describe material as to its intended use, makeup, recommended surface preparation and application conditions, primers, material mixing and application (including recommended dry mil thickness recoat time), precautions, safety and maintenance cleaning directions.

- D. Material Safety Data Sheets. Material Safety Data Sheets (MSDS) shall accompany all paint submittals and shall be prominently displayed at the job site during all painting activities.

1.05 PROTECTION OF WORK

- A. The Company shall be responsible for any and all damage to his Design-Build Work or the Design-Build Work of others caused by Company's painting activities during the time his Design-Build Work is in progress.

1.06 EXTRA STOCK – NOT USED

1.07 ONE MANUFACTURER

- A. To the maximum extent possible, all products shall be the product of **one manufacturer** unless a specific specialty coating system is specified. Without exception, all coatings for any service condition specified herein shall be by one manufacturer. Once a paint manufacturer has been selected by the Company, the Company shall ensure that all equipment manufacturers prime their equipment with the same or a compatible primer. If this cannot be or is not done for any reason, the Company shall apply a "universal primer" and recoat with the approved manufacturer's product in the field.

1.08 JOB CONFERENCE

- A. Prior to commencing painting work a pre-job conference shall be held for the purpose of reviewing the painting and coating requirements of the project. The City, City Engineer, Company, and Applicator representative shall be present. A schedule of work to be accomplished will be established.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Surfaces to receive paint and protective coating materials as herein specified in this Section shall be coated in conformance with the applicable coating systems specified herein. Coatings in contact with raw, finished or treated water within the Treatment Plant shall conform to requirements of ANSI/NSF Standard 61. All materials specified by name and/or manufacturer or approved for use under these specifications, shall be delivered unopened at the job site in their original containers and shall not be opened until inspected by the City Engineer.
- B. Whenever a manufacturer's brand name is specified, it is intended to define the general type and quality of paint or coating desired. Other coatings or paints of equal quality may be used. Coating materials shall be a product of TNEMEC, Carboline, Sherwin-Williams, or approved equal. All paint and coatings shall be produced and applied as herein called for or, if not specifically called for, it shall be applied in accordance with the manufacturer's printed recommendations as approved by City Engineer. Coating materials shall meet Volatile Organic Compounds (VOC) requirements of not more than 3.5 lbs/gal. as applied after thinning.

C. General.

1. Paint and protective coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use. Pigmented paints shall be furnished in containers not larger than five (5) gallons. Materials shall conform to the specifications shown herein and to the requirements hereinafter specified.
2. Products shall be standard of recognized manufacturer engaged in production of such materials for essentially identical or similar applications in the water and wastewater treatment industry.

D. Compatibility. Only compatible materials shall be used in the Design-Build Work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to approval of the City Engineer, a compatible barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.

E. Colors. All colors and shades of colors of all coats of paints and protective coating material shall be as identified in the color schedule, attached architectural sketches or as modified by the City. Each coat shall be of a slightly different shade, as directed by the City Engineer to facilitate inspection of surface coverage of each coat.

2.02 SERVICE CONDITION A

- A. Ferrous and galvanized metals, other than stainless steel, within corrosive atmospheres, submerged or intermittently submerged in chemical mixtures or similar corrosive liquids shall be prepared and coated in accordance with the following requirements. For the chemical storage area, see Service Condition F.
- B. Surface Preparation. All metal surfaces shall be field sandblasted in accordance with Steel Structures Painting Council Specification SSPC-SP10 (Near White Blast Cleaning). Weld surface, edges, and sharp corners shall be ground smoothly and all weld splatter removed per SSPC-SP3 "Power Tool" or SP2 "Hand Tool" Cleaning. Galvanized metals shall be cleaned per SSPC-SP7 (Brush Off Blast Cleaning).
- C. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All sharp edges, nuts, bolts, or other items difficult to coat shall receive a brush-applied coat of the specified coating prior to application of each coat.
- D. Except as otherwise noted, the prime coat shall have a minimum thickness of 3 mils and the two finish coats shall have a minimum total dry film thickness of 13 mils. If the finish coat is not applied within manufacturer's recommended time period, an intermediate special surface conditioner shall be applied in advance of finish coats or a light brush blast. The total system shall have a minimum dryfilm thickness of 16 mils.

TNEMEC System:

Shop Primer - Series 66-1211
Field Primer - Series 104
Finish Coats - Series 104

2.03 SERVICE CONDITION B

- A. Ferrous and galvanized metals, other than stainless steel, subject to chemical attack, shall be prepared and coated in accordance with the following requirements. See Paragraph 2.09 for asphaltic/bituminous coated pipe. For the chemical storage area, see Service Condition F.
- B. Surface Preparation. All surfaces shall be free of dirt, dust, grease, or other foreign matter before coating. Ferrous surfaces shall be cleaned in accordance with the Steel Structures Painting Council Specification SSPC-SP7 (Brush Off Blast Cleaning), and galvanized surfaces shall be cleaned in accordance with SSPC-SP1 (Solvent Cleaning). Weld surface, edges and sharp corners shall be ground smooth and all weld splatter shall be removed per SSPC-SP3 or SP2. Galvanized metal shall be cleaned per SSPC-SP7 (Brush Off Blast Cleaning).
- C. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All sharp edges, nuts, bolts, or other items difficult to coat shall receive a brush-applied coat of the specified coating prior to application of each coat.
- D. Except as specified below, the prime coat shall have a minimum dry film thickness of 3 mil, intermediate coat shall have minimum thickness of 4 mil, and one or more finish coats for a minimum total dry film thickness of 10 mils.

TNEMEC System:	Primer - Series 66 Intermediate Coat - Series 66 Finish Coats - Series 73
If In Contact with Finished Water:	Primer - Series 20 (Min 3 mil DFT) Finish Coats - Series 20 (Min 4 mil/ea DFT)

2.04 SERVICE CONDITION C

- A. Coating non-ferrous metal surfaces in contact with concrete or subject to corrosive atmosphere and condensation, shall be prepared and coated in accordance with the following requirements.
- B. Surface Preparation. Clean non-ferrous surfaces in accordance with SSPC-SP7 (Brush off Blast Cleaning).
- C. Application. Application shall be in strict conformance with manufacturer's printed recommendations.
- D. The prime coat shall have a minimum dry film thickness of 3 mil and one finish coat, for a total minimum dry film thickness of 7 mil.

TNEMEC System:	Primer - Series 66 Finish Coat - Series 66
If In Contact with Finished Water:	Primer - Series 20 Finish Coat - Series 20

2.05 SERVICE CONDITION D

- A. Coating exposed PVC pipe shall be prepared and coated in accordance with the following requirements.
- B. Surface preparation. Clean surfaces with SSPC-SP1 solvent cleaner. Lightly sand all surfaces. Degrease prior to sanding.
- C. Application. Application shall be in strict conformance with the manufacturers printed recommendations.
- D. Prime coat shall have a minimum dry film thickness of 3 mil, with one finish coat, for a minimum total dry mil thickness of 6 mils.

TNEMEC System:

Primer - Series 66

Finish Coat - Series 73

2.06 SERVICE CONDITION E

- A. Concrete which is subject to submergence and intermittent submergence in water or groundwater shall be prepared and coated in accordance with the following requirements. Waterproofing and/or dampproofing below grade concrete structures specified in Section 07100.
- B. Surface Preparation. All surfaces shall be cleaned of all dirt, dust, oil, curing compounds, and other deleterious compounds. In general, the concrete shall be reasonably smooth and free of pockets and cavities. All surfaces shall be cleaned by Brush Off Blasting (NACE #4 or SSPC-SP7). All surfaces shall be completely dry before application of the coating. Holes, pits, voids, and cracks shall be filled with applicable Filler and Surfacer.
- C. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All coats shall be applied within 24 hours of the previous coat.
- D. The prime coat shall have a minimum dry film thickness of 3 mils and two finish coats shall have a minimum total dry film thickness of 8 mils. The total system shall have a minimum dry film thickness of 11 mils.

TNEMEC System:

Primer - Series 20

Two Finish Coats - Series 20

2.07 SERVICE CONDITION F

- A. Concrete, CMU (up to 4 foot AFF), galvanized steel, stainless steel, and all other materials within the chemical storage containment areas shall be prepared and coated in accordance with the Coating Manufacturers recommended systems for the following chemicals:

1. Sulfuric Acid

2. Antiscalant

3. Citric Acid, 1-2%

4. Caustic Soda, 0.5-1.0%

5. Sodium Metabisulfite
6. Sodium Hydroxide, 50% solution
7. Sodium Hypochlorite, 12.5% solution
8. Hydrofluosilicic Acid, 23% solution
9. Zinc Orthophosphate or Poly Orthophosphate
10. Aqua Ammonia, 19% solution

2.08 ARCHITECTURAL PAINT FINISHES

- A. Manufacture. Unless otherwise noted, products listed below are the products of TNEMEC coatings. Approved equivalent products will be acceptable.

B. Interior Finishes:

1. Drywall/Semigloss
 Primer: TNEMEC Series 51-792 @ 1.0 - 2.0 mils DFT
 Finish: TNEMEC Series 7 @ 2.0 - 3.0 mils DFT

Minimum total DFT – 3.0 mils

2. **Drywall/Flat**
Primer: TNEMEC Series 51-792 @ 1.0 - 2.0 mils DFT
Finish: TNEMEC Series 6 @ 2.0 - 3.0 mils DFT

3. Wood/Semi-gloss
 Primer: TNEMEC Series 36-603 @ 2.0 - 3.5 mils DFT
 Finish: TNEMEC Series 23 @ 2.0 - 3.5 mils DFT

Minimum total DFT – 3.0 mils

4. Interior Wet Concrete Surfaces (Non-Aggressive Areas)
 Surface Preparation: Prefer SSPC-SP7: Brush off Blast Cleaning. If Brush Off Blast Cleaning is not possible, a double acid etching is recommended. Properly prepared surface should have a profile similar to 100 grit sandpaper. A test patch is recommended when applying epoxy coatings over old, existing coatings.

Materials:

- | | |
|-------------------|---------------------------------------|
| Primer: | TNEMEC Series 66 @ 3.0 - 5.0 mils DFT |
| 2nd Coat: | TNEMEC Series 66 @ 4.0 - 6.0 mils DFT |
| (optional)Finish: | TNEMEC Series 66 @ 4.0 - 6.0 mils DFT |
| | 11.0 - 17.0 mils DFT |

Minimum total DFT – 11.0 mils

5. Concrete Block Walls (Non-aggressive Environment)
Surface Preparation: Cure 14 days. Remove mortar spatter. Surfaces must be clean and dry.
Materials:
Filler: TNEMEC Series 130 or 54-562 @ 80 SF/Gal
Finish Ct.: TNEMEC Series 113 or 114 @ 4.0 - 6.0 mils DFT

Minimum total DFT – 4.0 mils

5. Poured Concrete Walls (Non-aggressive Environment)
Surface Preparation: Cure for 28 days. All surfaces must be clean and dry.
Materials:
Primer: TNEMEC Series 113 or 114 @ 4.0 - 6.0 mils DFT.
Finish: TNEMEC Series 113 or 114 @ 4.0 - 6.0 mils DFT.

Minimum total DFT – 8.0 mils

C. Concrete in aggressive areas (CBW)

1. Surface Preparation. Surfaces shall be cured for 28 days, clean, dry and free from curing compounds, oil, grease, dirt or chalk.
2. Filler. TNEMEC Series 54-660 (block walls only).
3. Prime Coat. One coat of TNEMEC Series 66 applied at 5 mils DFT.
4. Finish Coats. Two coats of TNEMEC Series 66 applied at 5 mils DFT per coat.

Minimum total DFT – 15.0 mils

D. Cementitious concrete tank exterior surface (CCT)

1. Surface Preparation. Pressure wash to remove surface contamination.
2. Waterproofing Coat. One coat, minimum 2 lbs. per square yard of ThoroSeal by Thoro System Products.
3. Finish Coat. Two coats of Tnemec W.B. Tnome-Crete Acrylic Emulsion applied at 10.0 mils dry film thickness, each coat.

Minimum total DFT – 20.0 mils

- E. Concrete Sealed (ECB) Huls Chem-Trete PB at a rate of between 50 and 100 SF/gal. Application shall be sufficient to guarantee complete water repelling for five (5) years.

2.09 PATCH COAT FOR GALVANIZED SURFACES SERVICE CONDITION

- A. All galvanized surfaces which are scratched, marred, or otherwise damaged shall be patched TNEMEC Series 90-97

2.10 PRIMER OVER BITUMINOUS COATING

- A. Two coats, TNEMEC Series 66, or approved equal, at 4.0 mils DFT each. Allow bituminous coating to bleed through on 1st coat. Apply second coat. Third coat shall be TNEMEC Series 73, 5 mil.

2.11 MISCELLANEOUS BURIED FERROUS METAL SURFACES

- A. All buried valves and other miscellaneous buried ferrous metal surfaces if not factory coated including all-thread restraining rods, after receiving SSPC-SP10 surface preparation and cleaning as previously specified, shall receive not less than two coats of polyamide epoxy coal-tar coating, and shall be TNEMEC Series 46H-413, or approved equal. No prime coat shall be applied under coal-tar mastic.
- B. Coating thickness shall be from 16 to 20 mils total dry-film thickness for the two coat system. Coated surfaces shall be dry before backfilling.

2.12 UNIVERSAL PRIMER

- A. The "universal-primer" shall be a primer which can be applied over any other type of solvent based primer, and be compatible with alkyds, epoxies and urethane finish coats.

PART 3 - EXECUTION

3.01 MANUFACTURER'S RECOMMENDATIONS

- A. Unless otherwise specified herein, the paint and coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protection of his coating materials; for preparation of surfaces for coating; and for all other procedures relative to coating shall be strictly observed. No substitutions or other deviations will be permitted.

3.02 DELIVERY AND STORAGE

- A. Materials shall be delivered in manufacturer's original, sealed containers, with labels and tags intact. Coating materials and equipment shall be stored in designated areas. Coating containers shall be opened only when required for use. Coatings shall be mixed only in designated areas. Coatings shall be thoroughly stirred or agitated to uniformly smooth consistency and prepared and handled in a manner to prevent deterioration and inclusion of foreign matter. Unless otherwise specified or approved, no materials shall be reduced, changed, or used except in accordance with the manufacturer's label or tag on container.

3.03 SAFETY REQUIREMENTS

- A. In accordance with the requirements of applicable OSHA Regulations for Construction, the Company shall provide and require the use of personal protective equipment for all persons working in or about the project site.
- B. Respirators shall be worn by all persons engaged in, and assisting in, spray painting. In addition, workers engaged in or near the work during sandblasting shall wear eye and face protection devices meeting the requirements of ANSI Z87.1 latest revisions, and approved OSHA Regulations for sand blasting operations and equipment including approved air-purifying, half-mask or mouthpiece respirator with appropriate filter.
- C. Ventilation. Where ventilation is used to control potential exposure to workers as set forth in Section 1910.94 of the OSHA Regulations for Construction, ventilation shall be adequate to reduce the concentration of the air contaminant to the degree that a hazard to the worker does not exist. Methods of ventilation shall meet the requirements set forth in ASNI-Z9.2, latest revision.
- D. Sound Levels. In accordance with Sections 1926.52 and 1926.101 of OSHA Regulations for Construction, whenever the occupational noise exposure exceeds maximum sound levels as set forth in Table D-2 ear protective devices shall be fitted and used, and a continuing, effective hearing conservation program shall be administered.
- E. Cloths and cotton waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each work day.

3.04 STORAGE, MIXING AND THINNING

- A. Paint and coating materials shall be protected from exposure to cold weather, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Materials of different manufacturers shall not be mixed together. Packaged materials shall be thinned immediately prior to application in accordance with the manufacturer's directions.

3.05 WORKMANSHIP

- A. Skilled craftsmen and experienced supervision shall be used on all Design-Build Work.
- B. All paint and coatings shall be applied to produce an even film of specified uniform thickness. Edges, corners, crevices, and joints shall receive special attention to ensure that they have been thoroughly cleaned and that they receive an adequate thickness of paint. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat of paint would not increase the hiding. All coats shall be applied so as to produce a film of uniform thickness. Special attention shall be given to ensure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other approved precautionary measures.

3.06 PREPARATION FOR PAINTING AND PROTECTIVE COATING

- A. All surfaces to receive paint and protective coatings shall be cleaned as specified herein prior to application of coating materials. The Company shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. Any required removal, repair, or replacement of this work caused by unsuitable conditions shall be done at no additional cost to the City. All marred or abraded spots on shop-primed and factory-finished surfaces shall receive touch-up restoration prior to any other coating application.

- B. Mildew shall be removed and neutralized by scrubbing affected areas thoroughly with a solution made by adding two (2) ounces of tri-sodium phosphate and eight (8) ounces of sodium hypochlorite to one (1) gallon warm water. Use a scouring powder, if necessary, to remove mildew spores. Rinse with clean water and allow to dry thoroughly before painting.

3.07 ITEMS NOT TO BE COATED

- A. Hardware, anodized aluminum, stainless steel, switch and receptacle plates, toilet room accessories, escutcheons, hardware accessories, name plate data tags, machined surfaces and similar items in contact with coated surfaces and not to be coated shall be removed or masked prior to surface preparation and painting operations. Following completion of coating of each piece, removed items shall be reinstalled. Such removal and installation shall be done by workmen skilled in the trades involved.

3.08 SANDBLASTING

- A. All sandblasting shall be done in strict accordance with the referenced specifications of the Steel Structures Painting Council.
- B. When items are to be shop primed or shop primed and finish coated in the shop, surface preparation shall be as specified in this Section. The City or his representative shall have the right to witness, inspect, and reject any sandblasting done in the shop.
- C. When sandblasting is done in the field, care shall be taken to prevent damage to structures and equipment. Pumps, motors, and other equipment shall be shielded, covered, or otherwise protected to prevent the entrance of sand.
- D. After sandblasting, dust and spent sand shall be removed from the surfaces by brushing or vacuum cleaning.

3.09 APPLICATION OF ARCHITECTURAL PAINT FINISHES

- A. Perform surface preparation, material mixing and application (including dry-mil thicknesses) for each "Architectural Paint Finish system" in strict conformance with submitted and approved material manufacturer's printed recommendations.

3.10 APPLICATION OF PROTECTIVE COATINGS

- A. Shop Coating. Fabricated metalwork and equipment which requires coating shall be shop primed with specified primer. Any such work delivered to the job site with any other shop coat shall either have this coating removed or shall be recoated with "universal-primer", and the specified coating applied in the field. Manufactured equipment with approved corrosion resistant factory finishes and galvanized finishes shall be exempt from this requirement.
- B. Application of Field Coatings.
 - 1. Except where in conflict with the manufacturer's printed instructions, or where otherwise specified herein, the Company may use brush, roller, air spray, or so-called airless spray application. Rollers for applying enamel shall have a short nap. Areas inaccessible to spray coating or rolling shall be coated by brushing or other suitable means.

2. The Company shall give special attention to the work to ensure that edges, corners, crevices, welds, bolts, and other areas, receive a film thickness at least equivalent to that of adjacent coated surfaces.
3. Prime coat shall be applied to all clean surfaces within a four hour period of the cleaning, and prior to deterioration or oxidation of the surface, and in accordance with the manufacturer's recommendations. Drift from sand-blasting procedures shall not be allowed to settle on freshly painted surfaces.
4. All coatings shall be applied in dry and dust-free environment. No coating or paint shall be applied when the surrounding air temperature, measured in the shade, is below 40 degrees F. No coating or paint shall be applied to wet or damp surfaces and shall not be applied in rain, fog or mist, or when the relative humidity exceeds 90 percent. No coating or paint shall be applied when it is expected that the relative humidity will exceed 90 percent or that the air temperature will drop below 40 degrees F within 8 hours after the application of the coating or paint. Dew or moisture condensation should be anticipated and if such conditions are prevalent, coating or painting shall be delayed to be certain that the surfaces are dry. The day's coating or painting shall be completed well in advance of the probable time of day when condensation will occur, in order to permit the film sufficient drying time prior to the formation of moisture.
5. Each coat shall be applied evenly, at the proper consistency, and free of brush marks, sags, runs, and other evidence of poor workmanship. Care shall be exercised to avoid lapping paint on glass or hardware. Coatings shall be sharply cut to lines. Finished coated surfaces shall be free from defects or blemishes. Protective coverings shall be used to protect floors, fixtures, and equipment. Care shall be exercised to prevent paint from being spattered onto surfaces from which such paint cannot be removed satisfactorily. Surfaces from which paint cannot be removed satisfactorily shall be painted or repainted. Whenever two (2) coats of a dark colored paint are specified, the first coat shall contain sufficient powdered aluminum to act as an indicator of proper coverage, or the two (2) coatings shall be of a contrasting color.
6. Touch-up of all surfaces shall be performed after installation.

C. Time of Coating.

1. Sufficient time shall be allowed to elapse between successive coats to permit satisfactory recoating, but, once commenced; the entire coating operation shall be completed without delay.
2. Piping shall not be finish coated until it has been pressure tested and approved.

D. Thickness of Coating. The dry film mil-thickness specified shall be achieved and verified for each coat.

3.11 TESTING AND INSPECTION

- A. Inspection Devices. The Company shall furnish, until final acceptance of coating and painting, inspection devices in good working condition for detection of holidays and measurement of dry-film thickness of coatings and paints. The Company shall also furnish U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates to test accuracy of dry-film thickness gauge and certified instrumentation to test accuracy.

- B. The Company shall conduct film thickness measurements and electrical inspection of the coated surfaces with equipment furnished by him and shall recoat and repair as necessary for compliance with the specifications.
- C. Coating thicknesses specified in mils on ferrous substrates will be measured with a nondestructive magnetic type dry-film thickness gage such as the Elecometer, manufactured by Gardner Laboratories, Inc. Discontinuities, voids, and pinholes in the coatings will be determined with a nondestructive type electrical holiday detector. Epoxy coatings and other thin film coatings will be checked for discontinuities and voids with a low voltage detector of the wet-sponge type, such as Model M1 as manufactured by Tinker and Rasor. Use a non-sudsing type wetting agent, such as Kodak Photo-Flo, which shall be added to the water prior to wetting the sponge. A high voltage, low current, spark type detector such as Model EP, manufactured by Tinker and Rasor, will be used for electrical inspection of only coal tar enamel. Tape type coatings will be inspected for holidays using a device designed for use in detecting such flaws. All pinholes shall be marked, repaired in accordance with the manufacture's printed recommendations and retested. No pinholes or other irregularities will be permitted. Film thickness discrepancies shall be measured and verified with a micrometer or other approved measuring instrument with 5 readings taken every 100 square feet of painted surface. Coatings not in compliance with the specifications will not be acceptable and shall be replaced and reinspected at Company's expense until the specifications are met.
- D. On non-ferrous surfaces, dry film thickness readings shall be taken at random locations with a Tooke Gauge at the rate of approximately five readings per 100 square feet of surface. Grooves cut into coatings shall be repaired by application of all coats of paint or coating film being tested. The average of all readings for a given area or surface shall be within required dry film thickness range and no individual reading shall be more than 20 percent below the recommended average dry film thickness. Any areas that are found to be below standard shall be marked and recoated to obtain proper film thickness.
- E. Warranty Inspection. Conduct warranty inspection during the two months following application of all coating and painting work. All personnel present at pre-job conference shall attend this inspection. Repair all defective work in accordance with this specification and to the satisfaction of the City or his appointed representative.

3.12 CLEAN-UP

- A. Upon completion of the work, staging, scaffolding, dropcloths, and containers shall be removed from the site or destroyed in an approved manner. Paint spots, oil, or stains upon adjacent surfaces shall be removed.
- B. The Company shall clean the site in accordance with Division 1.

3.13 PROCESS PIPING CODE

- A. All exposed pipe, including steel, ductile iron, Super Duplex 20, 316L stainless steel and brass tubing, galvanized steel, and polyvinyl chloride, shall be identified by labeling to show its function. Stainless steel piping and supports shall not be painted. Labels shall conform to the piping legend shown in Section 15060. Color coding for piping shall be as specified in Table II.

Table I
TYPICAL COATING SYSTEM SCHEDULE

Item	Service Condition
All exposed ferrous and galvanized metal piping and equipment (interior and exterior).	B
All submerged, intermittently submerged or corrosive atmosphere installed	A ferrous metals
Nonferrous metals in corrosive atmosphere and exposed access to hatches, condensation and (undersides of tank imbedded aluminum angles, etc.)	C
Chemical Storage Areas	F
All exposed PVC pipe (interior and exterior)	D
Interior of concrete manholes, tanks, and basins	E
Guard posts (bollards) and hydrants.	B
Interior concrete block walls.	CBW
Exterior of Concrete Tanks	CCT
All interior concrete floors, troughs and curbs, not receiving flooring	ECB

TABLE II
COLOR COATING SCHEDULE

Water Lines

Raw	Olive Green
Finished	Dark Blue

Chemical Lines

In accordance with ASME (ANSI) A13.1 - 2007 Scheme for the Identification of Piping Systems

Waste Lines

Sewer (Sanitary or Other)	Dark Gray
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Other

Compressed Air	Dark Green
Other Lines	Light Gray

In situations where two colors do not have sufficient contrast to easily differentiate between them, a six-inch band of contrasting color should be on one of the pipes at approximately 30 inch intervals. The name of the liquid or gas should also be on the pipe. Provide arrows indicating the direction of flow.

END OF SECTION

SECTION 09967 - INTUMESCENT PAINTS**1.1 SUMMARY**

- A. Fire-retardant intumescent paint for interior items and surfaces.

1.2 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: ASTM E 84.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Benchmark samples (mockups) for each type of coating and substrate required.

1.3 MATERIALS

- A. Water reducible or solvent reducible.

1.4 PRODUCTS

- A. Exposed Steel Surfaces, not otherwise protected or fire rated:
 - 1. Interior, Pigmented, to match adjacent or as specified in drawings:
 - a. Prime coat.
 - b. First and Second Coat: Intumescent-type, fire-retardant paint.
 - c. Topcoat.

1.5 APPLICATION

- A. Minimum Coating Thickness: Total dry film thickness of entire system as recommended by manufacturer.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 09967

SECTION 10155 - TOILET COMPARTMENTS**1.1 SUMMARY****A. Solid-polymer units as follows:**

1. Toilet Enclosures: Floor and ceiling anchored.
2. Entrance Screens: Floor and ceiling anchored.
3. Urinal Screens: Wall hung.

1.2 COMPONENTS**A. Solid-Polymer Units: Solid, high-density polyethylene (HDPE) panel material.****B. Brackets (Fittings):**

1. Stirrup Type: Chrome-plated, nonferrous, cast zinc alloy (zamac) or clear anodized aluminum.
2. Full-Height (Continuous) Type: Extruded aluminum.

C. Hardware and Accessories: Chrome-plated, nonferrous, cast zinc alloy (zamac) or clear anodized aluminum.**2.0 SUBMITTALS****A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.**

END OF SECTION 10155

SECTION 10200 - LOUVERS AND VENTS**1.1 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Company to design louvers.
- B. Wind Loads: As determined by structural engineer.

1.2 PRODUCTS

- A. Fixed, Extruded-Aluminum Louvers:
 - 1. Horizontal, Continuous Line, Storm-Resistant Hurricane Louver: 4 inches (100 mm) deep.
- B. Adjustable, Extruded-Aluminum Louvers:
 - 1. Operation: Two-direction motor.
 - 2. Horizontal, Storm-Resistant Hurricane Louver: 4 inches (100 mm) deep.
- C. Finishes:
 - 1. Aluminum: Class II, color anodic.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 10200

SECTION 10265 - IMPACT-RESISTANT WALL PROTECTION**1.1 SUMMARY****A. Impact-Resistant Wall Protection:**

1. Wall guards.
2. Impact-resistant handrails.
3. Bed locators.
4. Corner guards.
5. Impact-resistant wall coverings.
6. Door-protection systems.

1.2 WARRANTY**A. Materials and Workmanship: Five (5) years minimum.****1.3 PRODUCTS****A. Wall Guards:**

1. Plastic Crash Rail: Surface mounted.
2. Plastic Bumper Rail: Surface mounted.
3. Plastic Rub Rail: Surface mounted.
4. Wood Chair Rail: Maple with stained finish; surface mounted.
5. Opaque-Plastic Chair Rail: [**Surface mounted**] [**Surface mounted on spacers**].

B. Corner Guards:

1. Surface-Mounted, Resilient, Plastic Type: 4 feet (1.2 m).

C. End-Wall Guards:

1. Surface-Mounted, Resilient, Plastic Type: 4 feet (1.2 m).

D. Impact-Resistant Wall Coverings:

1. Semirigid, Impact-Resistant Sheet Wall Covering: Plastic sheet wall covering.
 - a. Height: Wainscot.
2. Prelaminated, Impact-Resistant Wall Panels: Plastic sheet wall covering laminated to high-impact-resistant core.
 - a. Height: Wainscot.

E. Door-Protection Systems:

1. Protection Plates: Plastic Armor, kick and mop plates.
2. Plastic push plates.
3. Plastic door-edge protection.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 10265

SECTION 10431 - SIGNAGE**1.1 SUMMARY**

- A. Plaques.
- B. Dimensional characters.
- C. Panel signs.
- D. Illuminated panel signs.
- E. Photoluminescent signs.

1.2 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.3 WARRANTY

- A. Materials and Workmanship: Five (5) years.

1.4 PRODUCTS

- A. Plaques:
 - 1. Cast Plaques: Aluminum with concealed stud mounting.
 - 2. Etched Plaques: Aluminum with concealed stud mounting.
- B. Dimensional Characters:
 - 1. Cast Characters: Aluminum with concealed stud mounting
 - 2. Aluminum Extrusions: Painted with concealed stud mounting.
 - 3. Molded Plastic Characters: Injection molded .
 - 4. Cutout Characters: Acrylic with laminated metal face mounted with adhesive.
- C. Panel Signs:
 - 1. Interior Panel Signs:
 - a. Material: Laminated, etched photopolymer sheet with raised graphics and Braille.
 - b. Frame: Unframed.
 - c. Mounting: Wall with concealed anchors..
 - d. Color: As selected by City Engineer from manufacturer's full range.

2. Exterior Panel Signs:

- a. Material: Aluminum sheet.
 - b. Frame: Unframed.
 - c. Mounting: Wall.
 - d. Color: As selected by City Engineer from manufacturer's full range.
3. Changeable Message Inserts: Slide-in inserts.
4. Subsurface Copy: Reverse engraved back face of painted acrylic sheet filled with enamel.

D. Photoluminescent Signs: Self-contained, "EXIT" sign, UL 924 as indicated in drawings.

1. Mounting: Wall or Ceiling.
2. Face Color: Red.
3. Service Life: 10 years.

1.5 FINISHES

A. Aluminum: Class I, color anodized.

1. Sheet or plate: Medium satin (directionally textured) finish.
 - a. Raised Finish: Painted
 - b. Recessed Finish: Painted

B. Acrylic Sheet: Copy and background colors that are UV and water resistant for five years.

1.6 INSTALLATION

- A. Wall-Mounted Signs: Mechanical fasteners, Mounted on glass with matching opaque plate on opposite side of glass.
- B. Bracket-Mounted Signs: Manufacturer's standard mounting.
- C. Dimensional Characters: Manufacturer's standard flush, projected mounting.
- D. Cast-Metal Plaques: Manufacturer's standard concealed mounting.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 10431

SECTION 10505 - METAL LOCKERS AND BENCHES**1.1 SUMMARY**

- A. All-welded, corridor metal lockers.
- B. Locker benches.

1.2 WARRANTY

- A. Materials and Workmanship for All-Welded Metal Lockers: Lifetime.

1.3 PRODUCTS

- A. All-Welded, Corridor Metal Lockers:
 - 1. Arrangement: Double tier.
 - 2. Body: 0.0528-inch- (1.35-mm-) thick, cold-rolled steel sheet.
 - 3. Locker base.
 - 4. Door Style: Louvered vents at top and bottom of face of door.
 - 5. Door Handle and Latch: Recessed with single-point latching.
 - 6. Locks: Combination padlock.
 - 7. Equipment: Hooks.
 - 8. Accessories: Continuous sloping tops.
 - 9. Finish: Baked enamel or powder coat.
- B. Locker Benches:
 - 1. Bench Tops: Plastic laminate.
 - 2. Fixed Pedestals: Tubular steel.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 10505

SECTION 10520

FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Provide fire extinguishers and cabinets in all new construction areas, as specified herein, and as needed for a complete and proper installation. Provide fire extinguishers in accordance with local fire codes.

1.02 SUBMITTALS

- A. Comply with pertinent provisions of Appendix 5 of the Service Contract.
- B. Product Data. The Company shall submit the following:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Dimensioned drawings as needed to depict the space required for these items.
 - 4. Manufacturer's recommended installation procedures which, when approved by the City Engineer, will become the basis for accepting or rejecting actual installation procedures used on the work.

PART 2 - PRODUCTS

2.01 CABINET

- A. Provide a Potter-Roemer, Model 7344-BA aluminum cabinet, or equal product of other manufacturer approved in advance by the City Engineer for each fire extinguisher installed.

2.02 FIRE EXTINGUISHER

- A. At each fire extinguisher cabinet provide one (1) fire extinguisher as specified below:

Multi-purpose chemical fire extinguisher with UL rating of 2A-10B:C, Model No. 3010-BA-VR by Potter-Roemer or equal approved in advance by the City Engineer.
- B. Service, charge, and tag the fire extinguisher not more than five calendar days prior to the date of Substantial Completion of the Work as that date is established by the City Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the City, anchoring all components with stainless steel hardware firmly into position for long life under hard use.

END OF SECTION

SECTION 10801 - TOILET AND BATH ACCESSORIES**1.1 SUMMARY**

- A. Public-Use Washroom Accessories: See Toilet and Bath Accessories cut sheets for the following:
 - 1. Toilet Tissue Dispenser.
 - 2. Paper Towel Dispenser.
 - 3. Waste Receptacle.
 - 4. Combination Towel Dispenser/Waste Receptacle.
 - 5. Multipurpose soap/towel dispenser unit.
 - 6. Liquid-soap dispenser.
 - 7. Grab bar.
 - 8. Vendor.
 - 9. Sanitary-napkin disposal unit.
 - 10. Seat-cover dispenser.
 - 11. Fold-down purse shelf.
 - 12. Mirror unit.
 - 13. Facial tissue dispenser.
- B. Public-Use Shower Room Accessories: See Toilet and Bath Accessories cut sheets for the following:
 - 1. Shower curtain rod.
 - 2. Shower curtain.
 - 3. Folding shower seat.
 - 4. Soap dish.
- C. Underlavatory guards.
- D. Custodial Accessories:
 - 1. Utility shelf.
 - 2. Mop and broom holder.
 - 3. Paper Towel Dispenser.
 - 4. Liquid-soap dispenser.

1.2 WARRANTY

- A. Silver Spoilage for Mirrors: Fifteen (15) years.

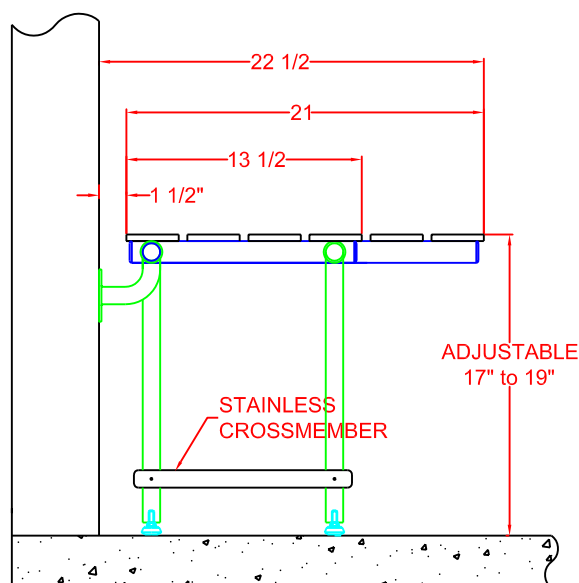
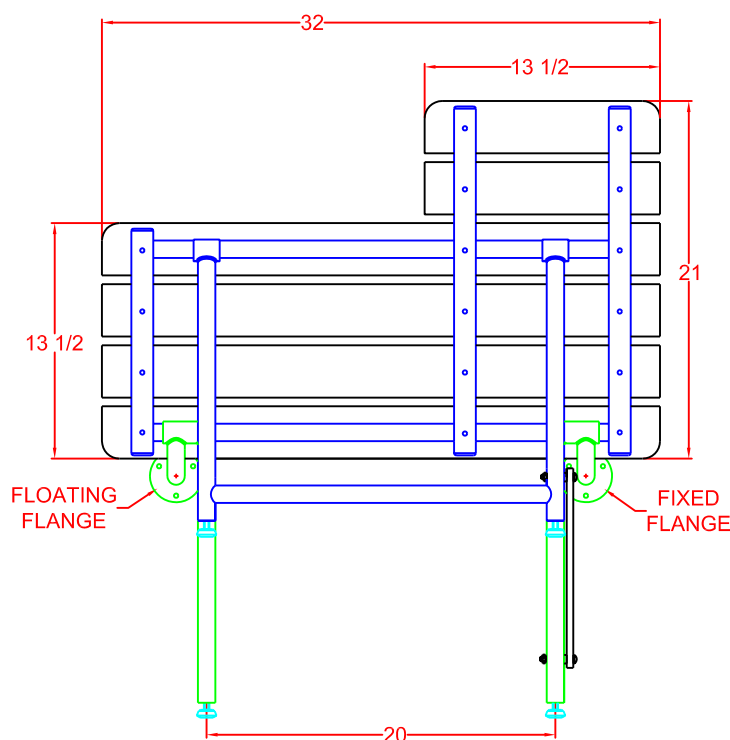
2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 10801

APCSSL2-320225-PW
32" x 22-1/2" SHOWER SEAT
Left Hand with Swing Down Leg

SHOWER SEAT
MODEL #APCSSL2-320225-PW
Left Hand with Swing Down Leg
(with White Phenolic Seat)



OPERATION:

Seat is automatically held in a raised position by a stainless cross member attached to the front and rear support legs. When seat is lowered into its down position the Swing Down Leg automatically aligns the front and rear support legs with the help of the stainless cross member.

ARCHITECTURAL SPECIFICATIONS:

Frame: Type 304 (18-8) S.S. tube, 1-1/4" (32mm) x 18ga. (1.2mm) sq. main frame with 1" (25mm) x 18ga. (1.2mm) rd. cross members. Leg: "H" - shaped yoke of type 304 (18-8) S.S. tubing, 1" (25mm) x 18ga. (1.2mm) rd. tubing, Heliarc welded to 1-1/4" (32mm) rd. x 12ga. (2.7mm) frame hinge

The Swing Down Legs automatically level when the seat is lowered to a horizontal sitting position. The seat automatically locks itself when swung into its "up" position with the use of the stainless cross member.

MATERIALS:

FRAME: Type 304 (18-8) S.S. tubing, 1-1/4" (32mm) x 18ga. (1.2mm) sq. main frame with 1" (25mm) x 18ga. (1.2mm) rd. cross-members.

WALL FLANGES (2): Type 304 (18-8) S.S., 10ga. (3.4 mm) x 3" (76mm) dia. heliarc welded to 1" (25mm) rd. x 18ga. (1.2mm) 90 degree leg supports, and to 1-1/4" (32mm) rd. x 12ga. (2.7mm) frame hinge couplings. Three mounting holes in each flange.

SWING DOWN LEG: "H" shaped yoke of type 304 (18-8) S.S. 1" Dia. (25mm) x 18ga. (1.2mm) rd. tubing, heliarc welded to 1-1/4" (32mm) rd. x 12ga. (2.7mm) frame hinge couplings.

SEAT CHOICES:(Designate when ordering)

NW or NA - White (NW) or Almond (NA) Naugahyde covering 2" (51mm) foam mounted on 1/2" (13mm) marine plywood.

PW or PT - White (PW) or Teak (PT) Finish Phenolic 1/2" (13mm) x 3" (76mm) slats bolted to frame with S.S. screws.

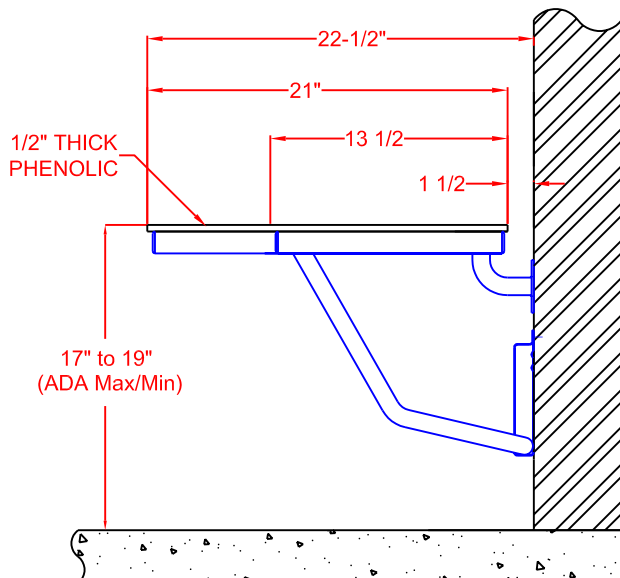
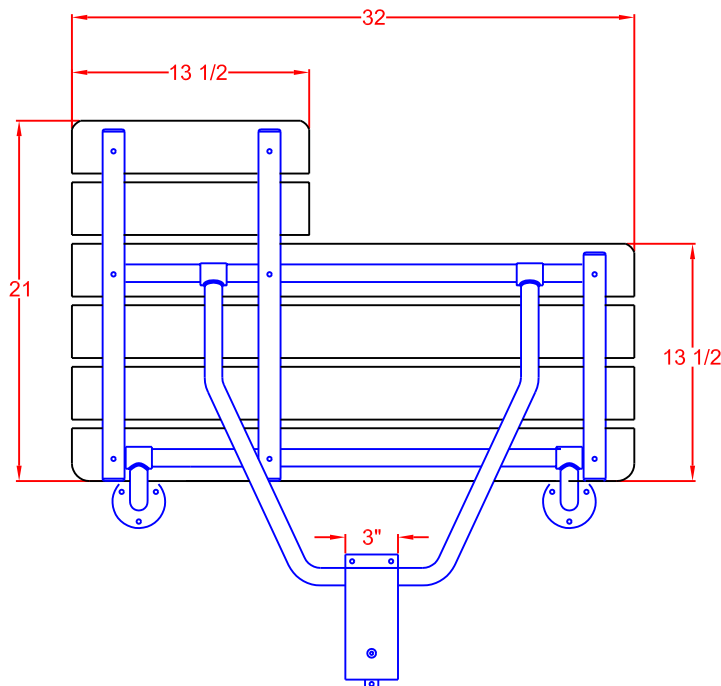
HW - White High Density Polyethelene (HDPE) 1/2" (13mm) thick, bolted to frame with S.S. screws.

INSTALLATION:

All Shower Seats must only be installed using suitable fasteners and sufficient in-wall backing materials. ADA mounting height for lowered seat is 17" (432mm) to 19" (482mm).

APCSSR-320225-PW
32" x 22-1/2" SHOWER SEAT
Right Hand

SHOWER SEAT
MODEL # APCSSR-320225-PW
Right Hand
(with White Phenolic Seat)



OPERATION:

Constant friction wall mounted bracket guides "U"-shaped leg freely up and down, resulting in a low pressure constant spring action to raise and lower seat. Seat is automatically held in a raised position by a positive stop friction spring guide bracket.

ARCHITECTURAL SPECIFICATIONS:

Frame: Type 304 (18-8) S.S. tube, 1-1/4" (32mm) x 18ga. (1.2mm) sq. main frame with 1" (25mm) x 18ga. (1.2mm) rd. cross members. Leg: "U" - shaped yoke of type 304 (18-8) S.S. tubing, 1" (25mm) x 18ga. (1.2mm) rd., with constant friction, wall mount guide bracket.

MATERIALS:

FRAME: Type 304 (18-8) S.S. tubing, 1-1/4" (32mm) x 18ga. (1.2mm) sq. main frame with 1" (25mm) x 18ga. (1.2mm) rd. cross-members.

WALL FLANGES (2): Type 304 (18-8) S.S., 10ga. (3.4 mm) x 3" (76mm) dia. heliarc welded to 1" (25mm) rd. x 18ga. (1.2mm) 90 degree leg supports, and to 1-1/4" (32mm) rd. x 12ga. (2.7mm) frame hinge couplings. Three mounting holes in each flange.

SUPPORT LEG: "U"-Shaped yoke of type 304 (18-8) S.S. Tube, 1" (25mm) rd. x 18ga. (1.2mm), heliarc welded to 1-1/4" (32mm) rd. x 12ga. (2.7mm) frame hinge coupling.

GUIDE BRACKET: Type 304 (18-8) S.S., 18ga. (1.2mm) x 3" (76mm) wide, constant friction, wall mounted guide bracket, with positive stop for raised position.

SEAT CHOICES:(Designate when ordering)

NW or NA - White (NW) or Almond (NA) Naugahyde covering 2" (51mm) foam mounted on 1/2" (13mm) marine plywood.

PW or PT - White (PW) or Teak (PT) finish Phenolic 1/2" (13mm) x 3" (76mm) slats bolted to frame with S.S. screws.

HW - White High Density Polyethelene (HDPE) 1/2" (13mm) thick, bolted to frame with S.S. screws.

INSTALLATION:

All Shower Seats must only be installed using suitable fasteners and sufficient in-wall backing materials. ADA mounting height for lowered seat is 17" (432mm) to 19" (482mm).



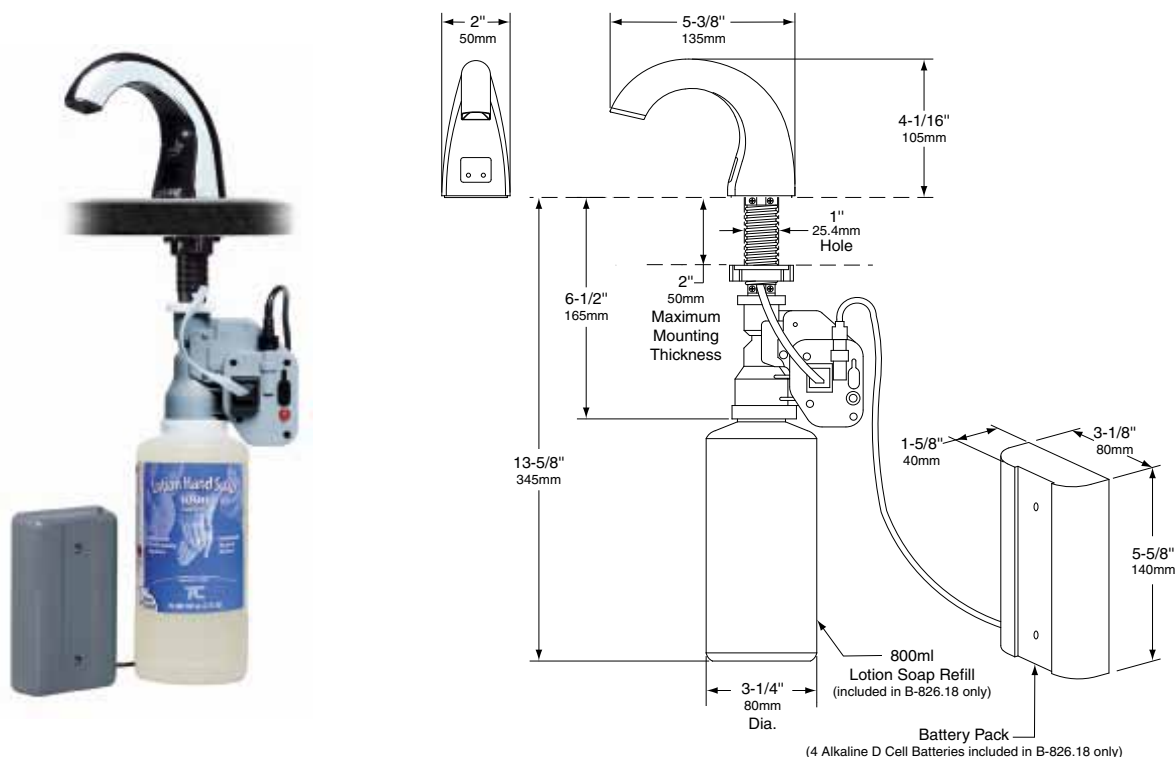
Technical Data

AUTOMATIC LAVATORY-MOUNTED SOAP DISPENSER

B-826 B-826.18

Specify Model Required:

- ☐ Model B-826 Automatic Lavatory-Mounted Soap Dispenser
☐ Model B-826.18 Starter Kit. Includes B-826 Soap Dispenser, an 800ml lotion soap refill, 4 Alkaline D Cell Batteries



MATERIALS:

Spout Cover Assembly — Bright Polished chrome plated plastic with LED light indicators. Red blinking LED indicates soap level is low, Yellow blinking LED indicates battery life is low. Equipped with integral plastic shank.

Motor Assembly — Water resistant, plastic construction, fits onto bottom of shank and top of soap refill.

Battery Pack — Water resistant, plastic material, holds 4 Alkaline "D" Cell Batteries. Batteries are included in Model B-826.18 Starter Kit only. Average battery life is 100 soap refills or 2 years.

Soap Refill — OneShot® Soap Refill. Translucent, shatter-resistant polyethylene bottle. Includes new supply tube and pump mechanism in each refill. Soap refill available in 27-fl oz (800ml) and 54-fl oz (1600ml) capacities. One 27-fl oz (800ml) bottle of Lotion Hand Soap with Moisturizers is included in Model B-826.18 only. OneShot® is a registered trademark of Technical Concepts, LLC.

Optional Spacer — Plastic spacer is included for mounting dispenser when sink rim is 3/4" (19mm) high or greater.

OPERATION:

Place hand under soap spout for approximately 2 seconds. Spout will dispense controlled amount (0.8ml) of Lotion Hand Soap with Moisturizers, Antibacterial Hand Soap or Lotion Hand Soap. 27-fl oz (800ml) soap refill provides 1000 hand washes, the 54 fl oz (1600ml) soap refill provides 2000 hand washes. Motor assembly is preset for 27-fl oz (800ml) soap refill (if 54-fl oz (1600ml) is used, a switch under the rubber plug next to red reset button must be moved to 2K). Once a new soap refill is connected, pressing the red reset button automatically resets the low soap indicator LED and primes the new soap refill.

continued . . .

INSTALLATION:

Unit is designed for installation in 1" (25mm) diameter hole in porcelain-enameled steel, cast iron or vitreous-china lavatories, as well as in countertops adjacent to lavatories. Unit may be mounted in unused faucet hole or through special hole requisitioned when lavatory is ordered from manufacturer (specify punching location). Shank accommodates maximum 2" (50mm) mounting thickness. Clearance required for soap refill bottle and motor housing is 5" (125mm) for the 27-fl oz (800ml) soap refill and 5-1/2" (140mm) diameter for 54-fl oz (1600ml) soap refill and 11-5/8" (295mm) minimum depth for height of 27 fl-oz. of soap refill bottle and motor housing and 13-5/8" (345mm) minimum depth for height of 5-fl oz. (1600ml) soap refill bottle and motor housing. Place 4 "D" Cell Batteries (included in Model B-826.18 only) into battery pack. An optional single 6V AC adapter to replace the battery pack is available, order Part No. 826-20.

	27-fl oz. 800ml	54-fl oz. 1600ml
Diameter of Bottle and Motor	5" 125mm	5-1/2" 140mm
Clearance Below Counter	11-5/8" 295mm	13-5/8" 345mm

SPECIFICATION:

Automatic Lavatory-Mounted Soap Dispenser shall dispense controlled amount (0.8ml) of Lotion Hand Soap with Moisturizers, Antibacterial Hand Soap or Lotion Hand Soap. Spout cover assembly to be Bright Polished chrome plated plastic. Meets Barrier-Free accessibility standards. Unit shall have blinking LED indicators to show low soap level and low battery life. Shank shall accommodate mounting thicknesses up to 2" (50mm). Translucent, shatter-resistant polyethylene soap refill (800ml soap refill included in model B-826.18 only) shall have capacities of 27-fl oz (800ml) or 54-fl oz (1600ml). Manufacturer's service and parts manual shall be provided to the building owner/manager upon request.

Automatic Lavatory-Mounted Soap Dispenser shall be Model B-826 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

BOBRICK

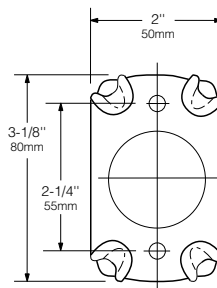
Technical Data

**1¼" (32mm) DIAMETER
STAINLESS STEEL GRAB BARS
WITH SNAP FLANGE****B-5806
SERIES**

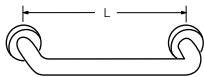
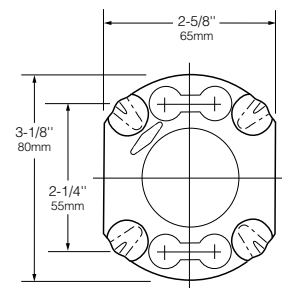
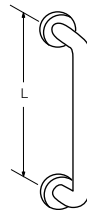
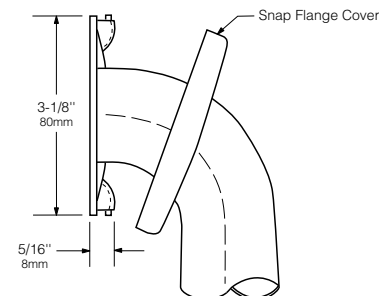
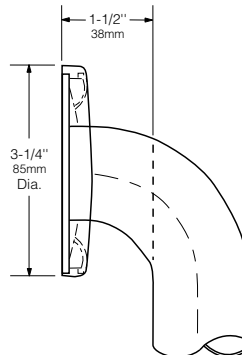
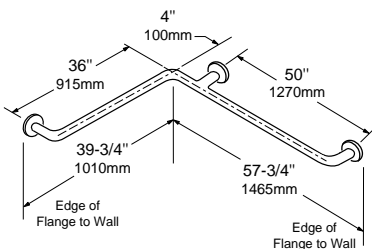
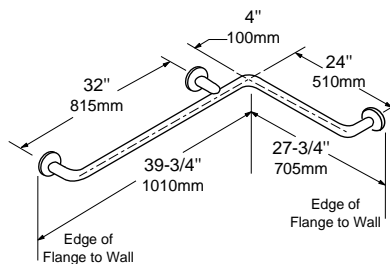
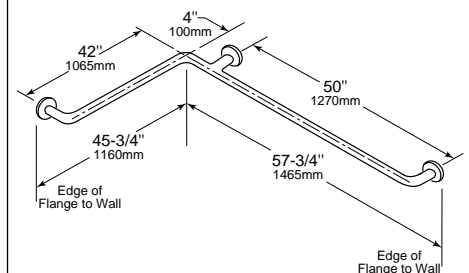
Specify Finish Required: ☐ Satin finish
☐ Satin finish with peened gripping surface; add suffix .99 to model number



End Mounting Flange



Intermediate Flange

**HORIZONTAL****VERTICAL****B-5806 x 12, 18, 24, 30, 36, 42, 48****TWO-WALL
WHEELCHAIR
TOILET COMPARTMENT****B-5837****HORIZONTAL
TUB/SHOWER/TOILET
COMPARTMENT BAR 24 x 36****B-58616****TWO-WALL
TOILET COMPARTMENT BAR 42 x 54****B-5897**

continued . . .

MATERIALS:

Grab Bar — 18-8 S, type-304, 18-gauge (1.2mm) stainless steel tubing with satin-finish. 1-1/4" (32mm) outside diameter. Ends are heliarc welded to concealed mounting flanges. Clearance between the grab bar and wall is 1-1/2" (38mm).

Concealed Mounting Flanges — 18-8 S, type-304, 1/8" (3mm) thick, stainless steel plate; end flanges 2" x 3-1/8" (50 x 80mm) with two holes for attachment to wall. Intermediate flanges 2-5/8" x 3-1/8" (65 x 80mm) wide x 3-1/8" (80mm) diameter.

Snap Flange Covers — 18-8 S, type-304, 22-gauge (0.8mm) drawn stainless steel with satin-finish. 3-1/4" (85mm) diameter x 5/8" (16mm) deep. Each cover snaps over mounting flange to conceal mounting screws.

STRENGTH:

Bobrick grab bars that provide 1-1/2" (38mm) clearance from wall can support loads in excess of 900 pounds (408kg) if properly installed. Other grab bar configurations can support loads in excess of 250 pounds (113kg) if properly installed, complying with barrier-free accessibility guidelines (including ADAAG in the U.S.A.) for structural strength.

Warning: *Grab bars are no stronger than the anchors or walls to which they are attached and, therefore, must be firmly secured in order to support the loads for which they are intended.*

INSTALLATION:

Provide concealed anchor device or backing as specified or required in accordance with local building codes before wall is finished. Fasten concealed mounting flanges to anchor device or backing with two screws in each flange. Snap flange covers over each mounting flange to conceal mounting screws. Concealed anchor devices and mounting screws are not included with Bobrick grab bars and must be specified as an accessory.

For Grab Bars with an Intermediate Flange(s), Pull Snap-Flange Covers away from mounting flanges. Place grab bar in desired mounting location. Use intermediate flange as a template to mark location of mounting screws at intermediate flange only. Mark screw locations at the center of the slot in the middle of the double-keyhole shaped mounting holes (2) in the intermediate flange. Remove grab bar from wall. Drive the intermediate flange mounting screws into wall at marked locations. **Note:** Make sure to leave a space of just over 1/8" (3.17mm) between the underside of the screw head and the wall. install grab bar on the wall by placing the round ends of the intermediate flange double-keyhole shaped mounting holes over the mounting screws (2) are located in the middle of the flange slots. Install the mounting screws into the wall at the end flanges and secure tightly. Tighten the mounting screws at the intermediate flange. Press all snap-flange covers into place to conceal mounting flanges.

Note: Recommend use of 1/4" or #14 (M6.3) sheet metal or wood screws to install Intermediate Flange. #12 (M5.5) screws may also be used.

Important Notes:

1. **Mounting Kits** — Bobrick has a selection of mounting screws and fasteners available for different types of installations; **one Bobrick mounting kit is required for each flange.**

Mounting Kit No.	Description
252-30	Consists of (3) #14 x 2½" (M6.3 x 64mm) type-304 stainless steel, Phillips round-head, sheet-metal screws.
2521-30	Consists of (3) 1/4"-20 x 3½" (M6.3-1 x 89mm) type-304 stainless steel, Phillips round-head, machine screws with plated-steel toggle nuts.
2522-30	Consists of (3) 1/4"-20 x 2" (M6.3-1 x 51mm) type-304 stainless steel, Phillips round-head, machine screws with metal expansion shields.

2. **Grab Bar Fastener** — Bobrick has a grab bar fastening system that secures all Bobrick grab bar series; **one Bobrick fastener is required for each flange.** Install grab bar without backing in wall requires minimum 5/8" (16mm) thick painted or tiled drywall.

WingIt™ Fastener No.	Description
251-4	Consists of (3) 10-32 x 5/16" round-head, Phillips 18/8 stainless steel screws. (1) WingIt grab bar fastener.

3. **Optional Anchor Device** — Bobrick grab bar anchor device includes stainless steel machine screws to be used for attaching grab bars to anchors. **one Bobrick concealed anchor device is required for each flange.**

Optional Anchor No.	Description
2583	Anchor for 3/4" to 1" (19-25mm) panel 1 anchor required for each flange.
2586	Anchor for 1/2" to 1" (13mm) panel 1 anchor required for each flange.

SPECIFICATION:

Grab bar shall be type-304 stainless steel with satin-finish. Grab bar shall have 18-gauge (1.2mm) wall thickness and 1-1/4" (32mm) outside diameter. Clearance between the grab bar and wall shall be 1-1/2" (38mm). Concealed mounting flanges shall be 1/8" (3mm) thick stainless steel plate, 2" x 3-1/8" (50 x 80mm), and equipped with two screw holes for attachment to wall. Flange covers shall be 22-gauge (0.8mm) stainless steel, 3-1/4" (85mm) diameter, and shall snap over mounting flanges to conceal mounting screws and/or WingIt fasteners. Ends of grab bar shall pass through concealed mounting flanges and be heliarc welded to form one structural unit. Grab bar shall comply with barrier-free accessibility guidelines (including ADAAG in the U.S.A.) for structural strength. Manufacturer's service and parts manual shall be provided to the building owner/manager upon request.

Grab Bar shall be Model _____ (insert model number) of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; and Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

INSTALLATION:

Mount wall hanger on wall with screws (not furnished) at points indicated by an S. For plaster or dry wall construction, provide backing to comply with local building codes, then secure wall hanger with screws (not furnished). When providing a concealed backing, allow backing to cover minimum range of mounting hole locations shown on drawing. For other wall surfaces, provide fiber plugs or expansion shields for use with screws (not furnished), or provide 1/8" (3mm) toggle bolts or expansion bolts. Hang mirror on wall hanger with all four backplate louvers engaged behind horizontal wall hanger members. Hang mirror on wall hanger with all four backplate louvers engaged behind horizontal wall hanger members. To do this, mirror must be centered in front of the wall hanger horizontally, pressed flat against the wall approximately 1" (25mm) above final position and then lowered into final position.

Snap Locking Design — Locking devices automatically secure mirror to concealed wall hanger when it is lowered into final position. Locking devices may be unlocked by inserting two flat blade screwdrivers behind each side of mirror near the bottom or under the bottom of the mirror and pulling mirror bottom forward and then up (see figure 3).

Screw Locking Design — Lock mirror to wall hanger by tightening Phillips-head locking screws that are concealed in the bottom of frame at points indicated by a T. Mirror may be unlocked from wall hanger by loosening locking screws and lifting mirror off of concealed wall hanger (see figure 4).

SNAP LOCKING DESIGN
(Front View)

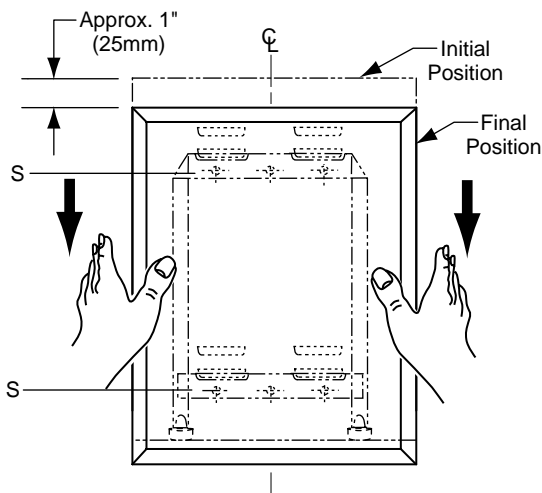


Figure: 3

SCREW LOCKING DESIGN
(Front View)

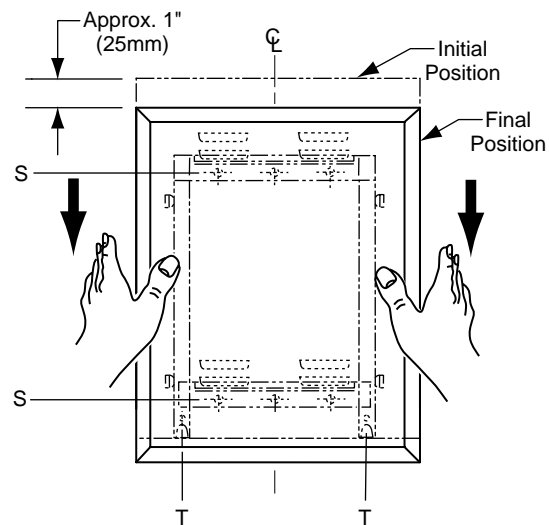


Figure: 4

SPECIFICATION:

Mirror shall have a one-piece type-430 stainless steel channel frame, 1/2" x 1/2" x 3/8" (13 x 13 x 9.5mm), with 90° mitered corners; all exposed surfaces shall have bright polished finish. Select float glass mirror shall be guaranteed for 10 years against silver spoilage. Corners shall be protected by friction-absorbing filler strips and the back shall be protected by full-size, shock-absorbing, water-resistant, nonabrasive, 3/16" (5mm) thick polyethylene padding. Galvanized steel back shall have integral horizontal hanging brackets located at top and bottom for mounting on concealed rectangular wall hanger to prevent the mirror from pulling away from the wall. Locking devices secure mirror to concealed wall hanger. Mirror shall be removable from the wall.

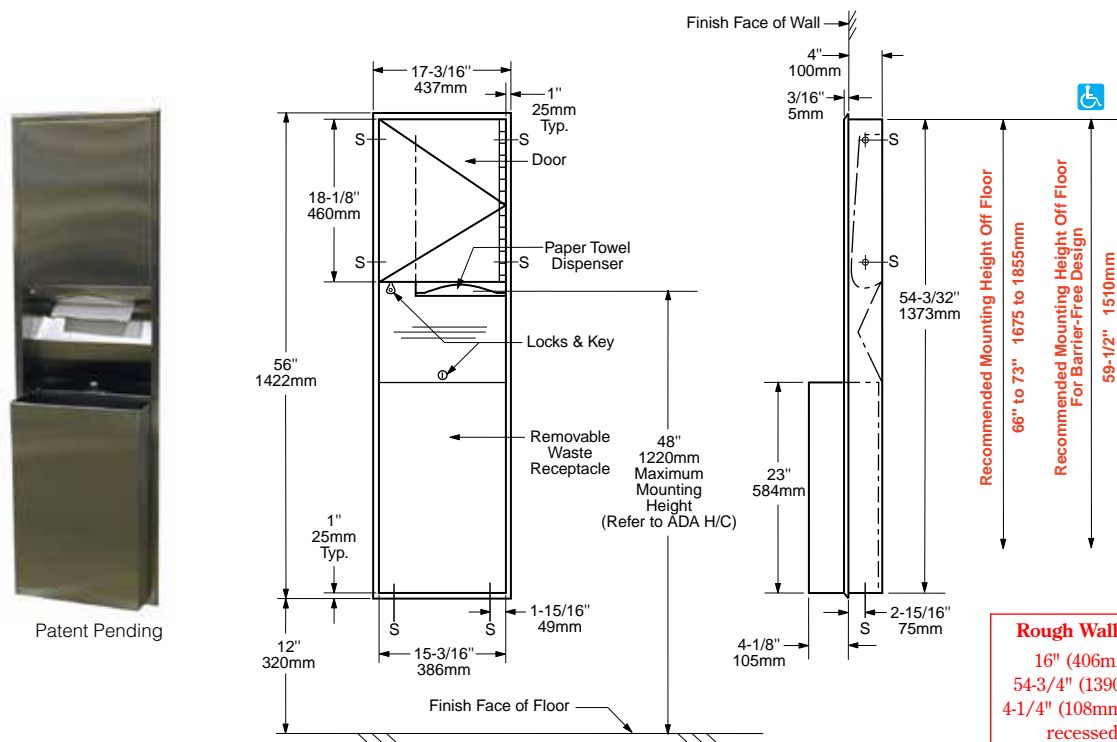
Framed Mirror shall be Model B-165 _____ (insert width and height) of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.



Technical Data

ClassicSeries™ RECESSED CONVERTIBLE PAPER TOWEL DISPENSER AND WASTE RECEPTACLE

B-3944



MATERIALS:

Cabinet — 18-8 S, type-304, heavy-gauge stainless steel. All-welded construction. Exposed surfaces have satin-finish.

Flange — 18-8 S, type-304, 22-gauge (0.8mm) stainless steel with satin-finish. Drawn and beveled, one-piece, seamless construction.

Door — 18-8 S, type-304, 22-gauge (0.8mm) stainless steel with satin-finish. Double-pan-back construction. Secured to cabinet with a full-length stainless steel piano-hinge. Equipped with a semi-concealed tumbler lock keyed like other Bobrick washroom accessories.

Paper Towel Dispenser — 18-8 S, type-304, 22-gauge (0.8mm) stainless steel with satin-finish. Rounded towel tray has hemmed opening to dispense paper towels without tearing. Capacity: 600 C-fold or 800 multifold paper towels.

Waste Receptacle — 18-8 S, type-304, 22-gauge (0.8mm) stainless steel with satin-finish. Front and sides of bottom and all top edges are hemmed for safe handling. Secured to cabinet with a tumbler lock keyed like other Bobrick washroom accessories. Equipped with interior hooks for optional vinyl liner. Capacity: 12-gal. (45.5-L).

OPERATION:

Paper towel dispenser accommodates C-fold or multifold paper towels without adjustment or use of adapters. To empty waste receptacle, unlock with key provided. Liner cannot be removed unless waste receptacle is unlocked from cabinet. Reusable vinyl liners are available as an optional accessory: order Bobrick Part No. 3944-12. This unit is field convertible to a Universal Roll Towel Dispenser by ordering Bobrick Part No. 3961-50 (Touch-Free Universal Roll Towel Dispenser Module). The waste capacity can be increased by ordering Bobrick part No. 368-60 (18-Gallon Waste Receptacle Module).

INSTALLATION:

Provide framed rough wall opening 16" wide x 54-3/4" high (406 x 1390mm). Minimum recessed depth required to finish face of wall is 4-1/4" (108mm). Allow clearance for construction features that may protrude into rough wall opening from opposite wall. Coordinate with mechanical engineer to avoid pipes, vents, and conduits. If unit projects above top of wainscot, provide aluminum channel or other filler to eliminate gap between flange and finish face of wall. Mount unit in wall opening with shims between framing and cabinet at all points indicated by an S, then secure unit with #8 x 1-1/4" (4.2 x 32mm) sheet-metal screws (not furnished).

SPECIFICATION:

Recessed convertible paper towel dispenser and waste receptacle shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Flange shall be drawn and beveled, one-piece, seamless construction. Door shall be secured to cabinet with a full-length stainless steel piano-hinge and equipped with a semi-concealed tumbler lock keyed like other Bobrick washroom accessories. Paper towel dispenser shall dispense 600 C-fold or 800 multifold paper towels. Removable waste receptacle shall be secured to cabinet with a tumbler lock, have front and side edges of bottom and all top edges hemmed for safe handling, and shall have a minimum capacity of 12-gal. (45.5-L). Manufacturer's service and parts manual shall be provided to the building owner/manager upon request.

Recessed Convertible Paper Towel Dispenser And Waste Receptacle shall be Model B-3944 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

- ☒ Model 9533 – Vinyl Shower Curtain (White) **Bradex®**
- ☒ Model 9534 – Duck Shower Curtain (White)
- ☒ Model 9535 – Anti-Bacterial Shower Curtain (Green)
- ☒ Model 9537 – Anti-Bacterial Shower Curtain (White) **Bradex®** ←

Model 9533 Vinyl Shower Curtain

Guide Specification

Shower curtain 6 gauge vinyl material with hemmed top edges and aluminum grommets on 6" centers. White only.

Vinyl Shower Curtain shall be Bradley

Model 9533-_____ "W x _____ "H (insert size).

Model 9534 Duck Shower Curtain

Guide Specification

Shower curtain 8 ounces, 100% cotton duck material with hemmed top edges and chrome plated nickel grommets on 6" centers. White only.

Duck Shower Curtain shall be Bradley

Model 9534-_____ "W x _____ "H (insert size).

Model 9535 & 9537 Anti-Bacterial Shower Curtain

Guide Specification

Shower curtain shall be of 10 ounce nylon reinforced anti-bacterial vinyl fabric, flameproof, stain resistant, self-deodorizing, furnished with aluminum grommets on 6" centers. Ideal for hospital applications. All sides hemmed. Model 9535 is Green. Model 9537 is White.

Antibacterial Shower Curtain shall be Bradley

Model 9535, 9537-_____ "W x _____ "H (insert size).

- ☒ Shower curtains have a tolerance of +/- 1" length and +/- 2" width, all sides hemmed.

9533 **Bradex®** Models

Width	Height	Overall Dimensions (Inches)	Overall Dimensions (Millimeters)	# of 9536 Shower Hooks Required (Order Separately)
36" (914 mm)	72" (1829 mm)	36 x 72	914 x 1829	7
42" (1067 mm)	72" (1829 mm)	42 x 72	1067 x 1829	8
48" (1219 mm)	72" (1829 mm)	48 x 72	1219 x 1829	9
72" (1829 mm)	72" (1829 mm)	72 x 72	1829 x 1829	13
Other sizes available upon request.				

9537 **Bradex®** Models

Width	Height	Overall Dimensions (Inches)	Overall Dimensions (Millimeters)	# of 9536 Shower Hooks Required (Order Separately)
42" (1067 mm)	72" (1829 mm)	42 x 72	1067 x 1829	8
48" (1219 mm)	72" (1829 mm)	48 x 72	1219 x 1829	9
72" (1829 mm)	72" (1829 mm)	72 x 72	1829 x 1829	13
Other sizes available upon request.				

**Washroom Accessories
Document No. 8980**

This information is subject to change without formal notice.

Always consult local and national codes for proper installation guidelines. Conformity and compliance to local and national codes is the responsibility of the installer.

10-28-2008

Orders composed of products indicated as **Bradex®** will be available to ship in three days after receipt of order at the factory. There is no pricing penalty for this service from Bradley.

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Phone: 800.BRADLEY (800.272.3539) Fax: 262.253.4161
bradleycorp.com

- ☒ Concealed Mounting
- ☒ Model 9538 – 1" O.D.
 - ☐ (36" Long) **Bradex**[®]
 - ☐ (42" Long)
 - ☐ (48" Long)
 - ☐ (60" Long) **Bradex**[®]
 - ☐ (72" Long)
- ☒ Model 9539 – 1-1/4" O.D.
 - ☐ (36" Long) **Bradex**[®]
 - ☐ (42" Long)
 - ☐ (48" Long)
 - ☐ (60" Long) **Bradex**[®]
 - ☐ (72" Long)

! For 72" lengths and greater, model 9522 Shower Rod Ceiling Support is required! Must specify distance from the ceiling!

Product Materials

FLANGES: glass polypropylene, 3/8" dia. Shower rod support sleeves formed with flange as one piece.

ESCUTCHEONS: 22 gauge stainless steel. One-piece drawn construction with exposed surfaces in architectural satin finish. Snap over flanges to conceal mounting screws.

TUBING: 18 gauge stainless steel, seamless construction with exposed surfaces in architectural satin finish.

Installation

Verify all rough-in dimensions prior to installation. To properly engage rod in support sleeves, rod length must be no less than approximately 1/4" shorter than wall opening. Secure one flange to wall with mounting screws (included) at holes provided. Align mounting holes vertically. Slip opposite flange and both escutcheons into place. Secure flange to wall and snap escutcheons over mounting flanges.

Optional Features

Feature	Suffix
<input type="checkbox"/> Bright polished finish	-4

Guide Specification

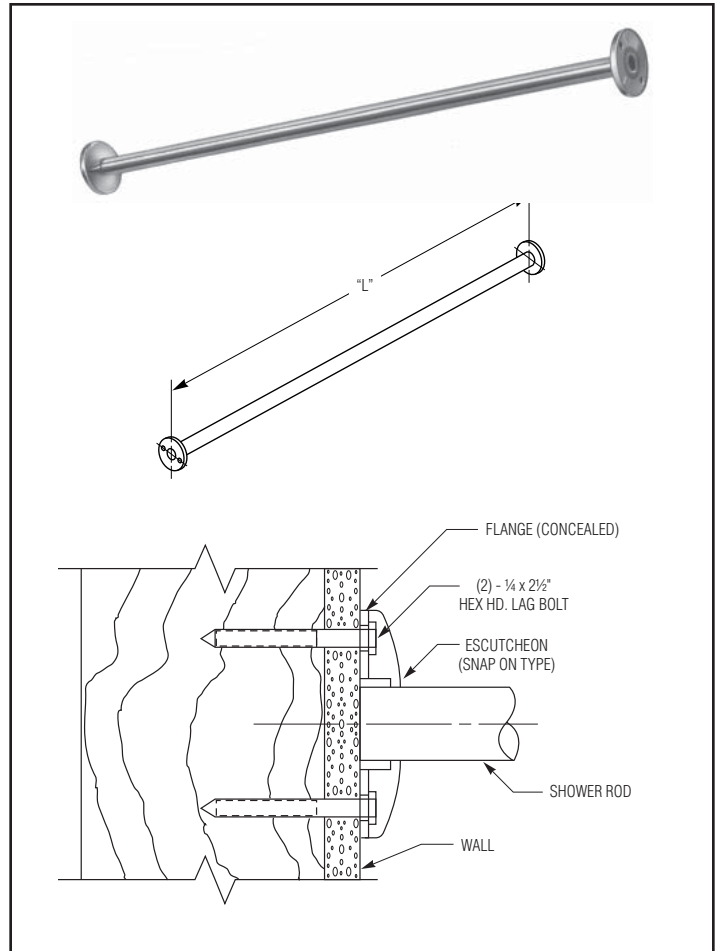
Concealed mounted shower rod shall be fabricated of 18 gauge stainless steel of seamless construction. Mounting flanges shall be of glass polypropylene with snap-on vandal-resistant protective escutcheons.

Washroom Accessories
Document No. 8985

Orders composed of products indicated as **Bradex**[®] will be available to ship in three days after receipt of order at the factory. There is no pricing penalty for this service from Bradley. This information is subject to change without formal notice.

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7-29-2009





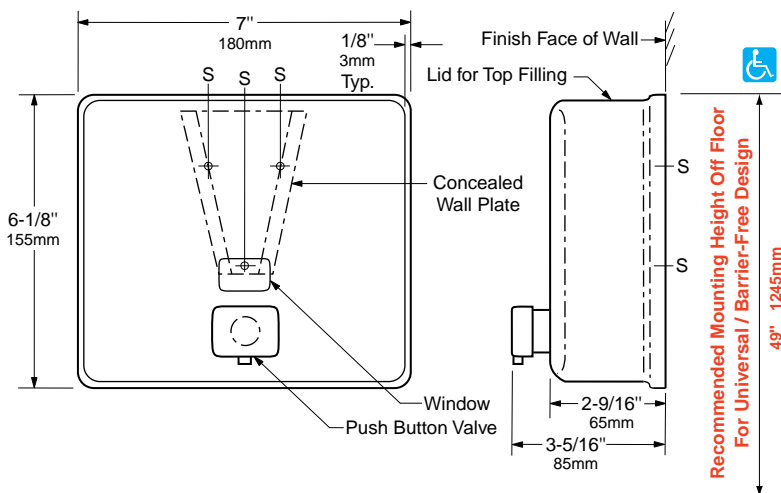
Technical Data

ConturaSeries® SURFACE-MOUNTED SOAP DISPENSER

B-4112



Patented



MATERIALS:

Container — Body is 18-8 S, type-304, 20-gauge (1.0mm) stainless steel with satin-finish. Drawn, one-piece, seamless construction. Front has same degree of arc as other Bobrick ConturaSeries washroom accessories. Radius on corners and edges complement other ConturaSeries accessories. Back plate is 22-gauge (0.8mm) stainless steel with 20-gauge (1.0mm) stainless steel mounting bracket attached. Container body and back plate are epoxy-sealed to prevent warping and leakage. Concealed wall plate is 20-gauge (1.0mm) stainless steel. Equipped with a plastic soap refill-indicator window and a locked, hinged stainless steel lid for top filling. Capacity: 40-fl oz (1.2-L).

Valve — Black molded plastic push button. Soap head-holding mushroom valve. Stainless steel spring. U-packing seal and duckbill. Antibacterial-soap-resistant plastic cylinder.

OPERATION:

Corrosion-resistant valve dispenses commercially marketed all-purpose hand soaps. To prevent corrosion, use only chloride-free pH-neutral liquid soaps. Valve operates with one hand, without tight grasping, pinching, or twisting of the wrist, and with less than 5 pounds of force (22.2 N) to comply with barrier-free accessibility guidelines (including ADAAG in U.S.A.). Window indicates when refill is required. The locked, hinged lid opens for top filling with special key provided. Concealed, vandal-resistant mounting.

INSTALLATION:

Secure wall plate to the wall with screws furnished at points indicated by an S. Slide mounting bracket of container down onto wall plate and secure unit with furnished locking-screw. For plaster or dry wall construction, provide concealed backing to comply with local building codes, then secure unit with screws furnished. For other wall surfaces, provide fiber plugs or expansion shields for use with screws furnished, or provide 1/8" (3mm) toggle bolts or expansion bolts.

Note: Surface-mount the dispenser plumb and true with valve 6" (152mm) to right or left of lavatory center. Provide 4" (102mm) minimum clearance from the lid to the underside of any horizontal projection. Push buttons should be located 44" (1120mm) maximum above the finish floor.

SPECIFICATION:

Surface-mounted soap dispenser shall be type-304 stainless steel with satin-finish. Corrosion-resistant valve shall dispense commercially marketed all-purpose hand soaps. To prevent corrosion, use only chloride-free pH-neutral liquid soaps. Valve shall be operable with one hand and with less than 5 pounds of force (22.2 N) to comply with barrier-free accessibility guidelines (including ADAAG in U.S.A.). Front of soap dispenser shall have same degree of arc and match other Bobrick ConturaSeries® accessories in the washroom. Radius on corners and edges of soap dispenser shall complement other Bobrick ConturaSeries® washroom accessories. Container body and back plate shall be epoxy-sealed to prevent warping and leakage. Soap dispenser shall have concealed, vandal-resistant mounting. Locked, hinged stainless steel lid for top filling shall require special key to open. Capacity shall be 40-fl oz (1.2-L). Manufacturer's service and parts manual shall be provided to the building owner/manager upon request.

Surface-Mounted Stainless Steel Soap Dispenser shall be Model B-4112 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

- ☒ Satin Finish Stainless Steel
- ☒ Surface-Mounted
- ☒ Vandal-Resistant Escutcheons

Product Materials

UNITS: No. 4 satin finish stainless steel.

ESCUTCHEONS: 2"W x 2"H, where applicable, unless otherwise indicated.

Installation

Verify all rough-in dimensions prior to installation. Secure mounting bracket to wall with screws (included) at holes provided. With escutcheon set screw on the bottom, align top end of escutcheon plate interior to top of wall bracket. Pivot escutcheon plate(s) down in position and tighten concealed set screw to lock unit in place.

Guide Specification

Surface-mounted accessory shall be fabricated of heavy gauge No. 4 satin finish stainless steel.



☒ **9014 Bradex®**
SOAP DISH WITH DRAIN HOLES

☐ **9014-63**
WITHOUT DRAIN HOLES. 4-1/4"W x 4"D



☐ **9044 Bradex®**
TUMBLER AND TOOTHBRUSH HOLDER
4-1/4"W x 4"D



☐ **9034**
HORIZONTAL TOWEL BAR WITH SOAP DISH
10-1/4"W x 3-1/8"D



☐ **9054**
3/4" SQUARE TOWEL BAR (SHOWN)
☐ 18"W **Bradex®**
☐ 24"W **Bradex®**
☐ 30"W

☐ **9065**
3/4" ROUND TOWEL BAR. PROJECTS 3"
☐ 18"W **Bradex®**
☐ 24"W **Bradex®**
☐ 30"W



☐ **9094**
PROJECTS 6-1/4" WITH 5" DEEP SHELF
☐ 18"W ☐ 24"W ☐ 30"W

Washroom Accessories
Document No. 8905



☐ **9104**
8" DEEP TOWEL SHELF
☐ 18"W ☐ 24"W



☐ **9104-90**
8" DEEP TOWEL SHELF WITH TOWEL BAR
☐ 18"W ☐ 24"W



☐ **9111**
CLOTHES HOOK.
1"W x 2-1/4"H x 1-1/2"D



☐ **9114 Bradex®**
SINGLE ROBE HOOK. PROJECTS 2"



☐ **9124 Bradex®**
DOUBLE ROBE HOOK. PROJECTS 2-1/4"



☐ **9134 Bradex®**
HAT AND COAT HOOK. PROJECTS 2-5/8"



☐ **9144**
DOOR STOP. PROJECTS 2-1/8"



☐ **9164**
BOTTLE OPENER



☐ **9314 Bradex®**
TOWEL HOOK. PROJECTS 4-7/16"



☐ **9334 Bradex®**
TOWEL RING. PROJECTS 2-3/8"

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Always consult local and national codes for proper installation guidelines. Conformity and compliance to local and national codes is the responsibility of the installer.

9-30-2008

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SECTION 11001

EQUIPMENT – GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provisions. Requirements specified in Conditions of Service Contract and Division 1, form a part of this Section.

B. Design-Build Work Included in this Section. The Company shall provide all the required labor, project equipment and materials, tools, construction equipment, safety equipment, transportation, and test equipment (unless otherwise specified) for furnishing, installation, adjustment, and full test loading of all the mechanical work shown on the drawings and included in these specifications. Those items specified as furnished by the City shall also be included in the Design-Build Work specified herein regarding installation adjustment and testing.

1.02 QUALITY ASSURANCE

A. Incorporated Documents. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of these specifications where cited by abbreviations noted in Section 01070 and below. In every situation, the latest specifications, standards, tests, etc., shall apply unless otherwise noted.

B. Variances. In instances where two codes are at variance, the more restrictive requirements shall apply.

C. Standard of Quality. Items of equipment are specified herein by the name of a manufacturer for the purpose of establishing a standard of quality and acceptable experience. Alternate equipment will be given consideration, per Section 01600.

D. Data. Unless otherwise specified, all equipment furnished shall have a data plate fabricated of 316 stainless steel with a minimum thickness of 1/16 inch and embossed or preprinted lettering, and fastened to the frame with corrosion-resisting pins. Nameplates shall have stamped on them the manufacturer, serial number, model number, type, operating and performance data, and other pertinent data. Letters and numerals shall not be smaller than 3/16 inch high.

E. Taggings. Where the size of the equipment prevents the fastening of data plates, name tags shall be provided and attached to the equipment and device item to identify it. The name tags shall have a rectangular configuration with square corners and shall be approximately 1-1/2 inches by 3 inches in size. They shall be made from brass or stainless steel sheet metal and have a minimum thickness of 0.032 inches. Letters and numerals shall be engraved or etched in the name tags by a professional engraver and shall not be smaller than 3/16 inch high in size. The name and number for each item of equipment, as designated on the drawings, shall appear on the name tag for the item. Valve tag information shall conform to Section 15100. A 3/16- inch diameter hole shall be provided in the upper left-hand corner of each name tag and shall be used to attached the name tags

to attached the name tags to the equipment and device items with 1/8-inch stainless steel cable.

1.03 DRAWINGS

A. Project Drawings. The drawings are diagrammatic and show the general layout of the complete construction Design-Build Work.

1. Locations of equipment, inserts, anchors, motors, panels, conduits, stub-ups, fittings, fixtures, water, power and process inlets, unless specifically dimensioned on the drawings, shall be determined to suit field conditions encountered, and the Company shall be responsible for ensuring clearance between pipes, equipment, and similar appurtenances, without extra cost to the City.

2. The Company shall review the drawings and specifications of other trades and shall include the mechanical work shown thereon that will be required for the installations.

3. Should there be a need to deviate from the drawings and specifications, the Company shall submit written details and reasons for all changes to the City Engineer for approval before making such changes. All extra costs to make the changes shall be borne by the Company.

B. Shop Drawings

1. Prior to fabrication, the Company shall obtain, from the manufacturer, shop drawings for all equipment. Shop drawings shall include fabrication, assembly, unit support drawings, installation drawings, and wiring diagrams together with detailed specifications and data covering materials used, power drive assembly, parts, devices, and other accessories forming a part of the equipment to be furnished.

2. The Company shall submit Certified performance or Certified test curves, as specified for all pumps furnished under this Service Contract. The Company shall notify the City Engineer three weeks prior to all testing should the City Engineer elect to witness the tests.

3. Submit shop drawings and material lists for approval as specified in applicable Sections and in conformance with the requirements of Appendix 5 of the Service Contract.

1.04 ADAPTATION OF EQUIPMENT

A. Should any alternate equipment selected require any revision to the structure, piping, electrical, or other work shown on the drawings, the Company shall include the cost of such revisions in his bid for the equipment and no extra payment shall be made for such revision. All such revisions shall be subject to the approval of the City Engineer.

1.05 UTILITY SERVICE AND PROCESS INTERRUPTION

A. All utility service and/or process interruptions initiated by the Company in the prosecution of his Design-Build Work shall be scheduled in advance and approved by the appropriate Utility Company and the City. Refer also to requirements of Section 01600 and information provided in Section 01040.

1.06 OPERATION AND MAINTENANCE MANUALS

A. The Company shall submit to the City Engineer operation and maintenance manuals on all mechanical equipment in accordance with the requirements of Appendix 11 of the Service Contract.

1.07 EQUIPMENT GUARANTEE

A. The Company shall furnish and replace, without cost to City, all equipment parts that are defective or show undue wear within one (1) year from the date of acceptance of the Design-Build Work by the City unless extended periods of warranty for specific pieces of equipment are specified elsewhere. In addition to performance guarantees, all processes or systems shall comply with the requirements of applicable portions of the Sections of these specifications describing those systems.

PART 2 - PRODUCTS

2.01 MATERIALS AND WORKMANSHIP

A. All equipment furnished under this Division shall be new and guaranteed free from defects in materials, design, and workmanship. These specifications, to the extent possible, identify service conditions and requirements for all equipment; however, it shall be the manufacturer's responsibility to ascertain, to his satisfaction, the conditions and service under which the equipment will operate and to warrant that operation under those conditions will be successful. All parts of the equipment shall be amply proportioned for all stresses that may occur during fabrications, erection, and intermittent or continuous operation.

B. All equipment shall be designed, fabricated, and assembled in accordance with the best modern engineering and shop practices. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required for tests. Materials shall be suitable for service conditions.

C. Except where otherwise specified, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction. All structural members shall be considered as subject to shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment, shall have a minimum nominal thickness of 1/4 inch. The location of the fabricator and his shop schedule shall be furnished to the City Engineer prior to the beginning of fabrication so that the City Engineer can schedule shop inspection if so desired.

2.02 SAFETY GUARDS

A. All belt or chain drives, fan blades, couplings, exposed shafts and other moving or rotating parts shall be covered on all sides by safety guards which shall be free of all sharp edges and corners. Safety guards shall conform to the requirements of appropriate safety agencies, such as OSHA.

B. Safety Guards shall be fabricated from 16 US Standard gauge, or heavier, galvanized or aluminum-clad sheet steel or 1/2-inch mesh, galvanized expanded metal. Each guard shall be designed for easy installation and removal. All necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be hot-dip galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water.

2.03 EQUIPMENT BASES AND BEDPLATES

A. A heavy cast-iron or welded steel base shall be provided for each item of equipment which is to be installed on a concrete foundation. Equipment assemblies, unless otherwise specified, or shown on the drawings, shall be mounted on a single, heavy, cast-iron or welded steel bedplate. Bases and bedplates shall be provided with machined support pads, tapered dowels for alignment of mating, or adjacent items, adequate openings to facilitate grouting, and openings for electrical conduits. All seams and contact edges between steel plates and shapes shall be continuously welded and ground smooth. The plates shall have a minimum thickness of 1/4 inch. All pump bedplates must include a drip lip and provision for directing accumulated gland leakage to a single disposal drain point. Pipe all accumulated gland and seal water leakage and spent cooling water to a floor drain provided adjacent to each piece of equipment. Floor drain may be provided for more than one piece of equipment provided the equipment drain line does not create a safety or tripping hazard.

2.04 JACKING SCREWS AND ANCHOR BOLTS

A. Jacking screws shall be provided in the equipment bases and bedplates to aid in leveling prior to grouting.

B. Equipment suppliers shall furnish anchor bolts, nuts, washers, and sleeves of adequate design as required for proper anchorage of the bases and bedplates to the concrete bases. Sleeves shall be a minimum of 1-1/2 times the diameter of the anchor bolts. Unless otherwise shown or specified, anchor bolts for items of equipment mounted on baseplates shall be long enough to permit 1 inch of grout beneath the baseplate and to provide adequate anchorage into structural concrete. Anchor bolts, together with templates or setting drawings, shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete is placed. Anchor bolts shall be 316 stainless steel which conforms to ASTM A-167 and ASTM A-267.

2.05 DRIVES

A. General. All drive units shall have an AGMA rating and service factor suitable for 24 hours per day operation under the specified maximum, or "worse case" operating load. Drive unit housings shall be constructed of high-grade cast iron, welded steel, or other suitable material. Thermal rating of each unit shall exceed the design load or proper cooling devices shall be provided. All drives shall be designed especially for the service for which they are to operate.

B. Electric Motors. All electric motors supplied under this Service Contract shall conform to all requirements specified in Division 16. Additional or superseding requisites for certain motors may be found in Division 11, and to a lesser extent, in other Divisions wherein electric motor driven equipment is specified. The Company must coordinate the work of all trades, and the functional, safety and Code requirements for each installation, in order to comply with these Specifications.

C. V-Belt Drives. Where motors are mounted above the driven machine on a pedestal, the belt tensioning shall be accomplished by four studs which are double nutted to the motor plate to raise and lower the motor plate. Hinges with a jacking screw to tension the belts shall not be used. Where motors are mounted horizontally adjacent to the driven equipment, belt tensioning shall be

shall be accomplished by utilization of sliding rail type motor mount, with manual adjustment of motor location, and thereby, belt tension, through a manual, permanently mounted hand crank mechanism. All V-belt tensioning devices shall be such that under no circumstances will it be possible for any device, once set to the desired adjustment, to go out of the adjustment due to the load being imposed upon the drive at that setting. This requirement shall not be construed to mean that a set belt tension may not go out of adjustment due to gradual stretching of belts, but shall mean that no portion of any device or devices used to accomplish belt tensioning may slip, become loose, or otherwise move from the desired setpoint, once selected, except when manually reset by operating personnel by use of the adjustment device or devices.

2.06 LUBRICATION

A. Lubrication of equipment shall ensure constant presence of lubricant on all wearing surfaces. Lubricant fill and drain openings shall be readily accessible. Easy means for checking the lubricant level shall be provided. Prior to testing and/or operation, the equipment shall receive the prescribed amount and type of lubricant as required by the equipment manufacturer. The Company shall provide to the City a 1-year supply of lubricants for each piece of equipment installed. All lubricants shall be properly packaged, labeled, and delivered to the City concurrent with equipment installation. An inventory listing of lubricant types by equipment and quantities shall be provided.

2.07 GEARS

A. Provide oil-lubricated totally-enclosed gear reducers and increasers.

B. Service Ratings. Each gear shall have a nominal service horsepower rating at least equal to the nameplate rating of the driving motor. Each gear shall have mechanical and thermal capacity equal to or greater than an equivalent horsepower determined by multiplying the service horsepower rating by the specified service factor recommended by AGMA for heavy duty service, except each set of worm gears shall have a minimum service factor of 1.20 and all other gears shall have a minimum service factor of 1.50.

C. Bearings. Provide antifriction bearings throughout, designed to give a minimum 20,000 hours B10 life for the specified horsepower in continuous operation, of proportions, mountings, and adjustment consistent with acceptable modern practices for applied radial and thrust loads at speeds involved. Provide thrust bearing rates at 1-1/2 times the maximum thrust loadings involved.

D. Gear Nameplates. Equip each gear with an AGMA nameplate which shows service horsepower, actual service factor for actual mechanical or thermal rating as applicable, and AGMA gear Class I rating.

2.08 PRESSURE GAUGES

A. Pressure gauges shall be installed in the suction (where shown) and discharge of each pump. The gauges shall be 4-1/2" diameter and in accordance with Division 13 and shall include a petcock between the pump and the gauge. For solids bearing or corrosive fluids a diaphragm gauge isolator or tubular isolator shall be provided. Suction gauges shall be of the compound type and

type and shall have a range of 30 inches of mercury to 30 psig. Discharge gauge ranges shall be a standard commercially available range with the maximum reading not less than 30 psi greater than the pump rated shut off pressure and shall be equipped with snubbers.

PART 3 - EXECUTION

3.01 COORDINATION

A. The drawings show, in a diagrammatic form, the arrangements desired for the principal apparatus, piping, and similar appurtenances, and shall be followed as closely as possible. Proper judgment must be exercised in carrying out the work to secure the best possible headroom and space conditions throughout, to secure neat arrangement of piping, valves, fixtures, hangers, and similar appurtenances, and to overcome local difficulties and interferences of structural conditions wherever encountered.

B. The Company shall take all measurement for his work at the installation sites, verify all subcontractor drawings prior to required submittal and be responsible for the proper installation, within the available space, of the apparatus specified and shown on the drawings. The Company must secure the approval of the City Engineer for all variations and/or substitutions before making any changes.

3.02 PROTECTION

A. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling and storage. All equipment shall be protected from exposure to the elements and shall be kept thoroughly dry and clean at all times. Pumps, blowers, motors, electrical equipment, and other equipment having anti-friction or sleeve bearings shall be stored in weathertight storage facilities such as warehouses. All materials and equipment showing evidence of rust, dirt contamination, or other surface or subsurface deterioration shall be cleaned and restored to the City Engineer's satisfaction prior to installation.

B. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces which are damaged prior to acceptance of equipment shall be repainted in accordance with the requirements of Section 09905 to the satisfaction of the City Engineer.

C. Electrical equipment, controls, and insulation shall be protected against moisture or water damage.

D. The Company shall maintain equipment storage facilities in accordance with the provision of Division 1.

E. All equipment shall be stored in the designated storage facilities from delivery until installation.

F. All mechanical equipment, whether in the Company's designated storage facility prior to final installation, or whether installed, but not yet placed into service or accepted by the City, shall be periodically exercised or rotated at intervals, and in accordance with procedures prescribed by each manufacturer, if such a recommendation is included in the manufacturer's installation, operation and maintenance instructions.

3.03 INSTALLATION CHECK

- A. The Company shall have an experienced, competent, and authorized representative of the manufacturer or supplier of each major item of equipment visit the site of the work and inspect, check, adjust if necessary, and approve the equipment installation. In each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The Company shall have the equipment supplier's representative revisit the job site as often as necessary until all problems are corrected and the equipment installation and operation is satisfactory to the City Engineer.
- B. Each equipment supplier's representative shall furnish to the City, through the Company, a written report certifying that the equipment: (1) has been properly installed and lubricated; (2) is in accurate alignment; (3) is free from all stress imposed by connecting piping or anchor bolts; and, (4) has been operated successfully under full load conditions.
- C. Equipment manufacturers shall furnish the services of competent, factory-trained personnel during the warranty period specified to inspect, service, and repair the equipment where required. Service requests shall be answered and acted upon promptly. This requirement shall not include normal maintenance and service of equipment, which will be the responsibility of the City.
- D. All costs for this work shall be included in the price bid by the Company.

3.04 EQUIPMENT INSTALLATION

- A. All equipment shall be installed in full accordance with the equipment manufacturer's recommendations and good practice. Where specified in other parts of this Division, factory-trained service personnel shall be on-site to supervise the installation. Sufficient notice shall be given to the City Engineer prior to equipment installation in order that the City Engineer or his representative may be present during installation. In general, the following installation practices shall be followed:
 - 1. Examine equipment for damage in shipping and handling. The examination shall include checking for corrosion, poor workmanship, dirt or deleterious substances, and poor fits.
 - 2. Level the base plate or bedplate.
- B. Install equipment.
- C. Check alignment of couplings.
- D. If grout has been used, check alignment and levelness after the grout has set.
- E. Check direction of rotation and correct, if necessary, to insure proper operation.
- F. Provide drain lines from all equipment gland leakage housings, seal water openings, and strainers to nearest floor drain or point of disposal. Blow-down valves shall be provided on all strainers whether or not shown on the drawings.

3.05 PLACING IN OPERATION

A. Prior to being placed in operation, equipment shall be inspected by the manufacturer's factory-trained personnel. All defects discovered during this inspection shall be corrected prior to initial equipment start-up. Internal coatings applied at the factory shall be removed if required. Lubricant shall be applied in the proper places and levels shall conform to the manufacturer's recommendations. In the presence of the City Engineer, full-load operational testing shall be performed and the results of such tests shall be recorded. Unsatisfactory performance shall be corrected and tests shall be repeated until the equipment performance meets the specifications. The Company shall furnish all power, materials, services, test equipment and labor required to successfully complete all full load equipment testing specified. The Company shall certify in writing to the City Engineer, in triplicate, that all tests were conducted in accordance with these specifications and that all components within each system successfully function as required. The Company shall notify the City Engineer ten (10) calendar days in advance of the time when the equipment will be placed into operation. During the course of initial operation, the Company shall instruct City's personnel in the proper operation and maintenance of the equipment, as specified herein.

3.06 INSTRUCTION – NOT USED

3.07 SPECIAL TOOLS AND ACCESSORIES

A. All special tools, special tool lists, equipment, or accessories required for the installation and maintenance of equipment specified in Division 11, shall be provided by the equipment manufacturer. Special tools shall be defined as those items manufactured by the equipment supplier specifically for performing maintenance and installation of their respective equipment.

3.08 SHOP PAINTING

A. Except as specifically supplemented or superseded by requirements herein, shop painting shall conform to requirements in Section 09905, "Painting and Protective Coatings." Electric motors, gears, starters, and other similar self-contained or enclosed components shall be shop primed and finished with a high-grade oil-resistant acrylic enamel. Surfaces which will be inaccessible after assembly shall be painted or otherwise protected before assembly by a method which provides protection for the life of the equipment.

B. Surfaces to be painted at the project site shall be shop painted with one or more coats of a primer which will adequately protect the equipment until finishes are applied at the project site. Primers shall be as specified in Section 09905. All equipment shall be primed with primer compatible with the coating system selected by the Company, and if not, the Company shall reprime the equipment such that it is compatible and in conformance with Section 09905.

C. Machined and polished metallic surfaces which are not to be painted shall be coated with a rust preventive compound as specified in Section 09905.

3.09 DAMAGED PRODUCTS

A. The Company shall notify the City Engineer in the event that any equipment or material is

is damaged subsequent to receipt at the job site, and prior to acceptance of the installation by the City.

B. Repairs to damaged products in lieu of replacement shall not be made without prior approval by the City Engineer.

END OF SECTION

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	8/31/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:	Sanitary Sewage Pumps	PROJECT NO.:	260363.09000
EQUIPMENT NAME:			
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Sewage	# OF UNITS:	2
CAPACITY (Rate; Head)	100 GPM, 150 feet		
MANUFACTURER; SIZE; CONFIGURATION:	10 HP; Constant Speed /Centrifugal, Submersible		
SPECIAL CONSTRUCTION MATERIAL:			
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):	10 HP; 480V; 3 ph; 60 Hz		
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	8/31/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	R.O Feed Pumps		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Raw Water	# OF UNITS:	5 Initial – 3 Future
CAPACITY (Rate; Head)	2,500 gpm @ 565-ft		
MANUFACTURER; SIZE; CONFIGURATION:	Flowserve; 600 HP; Vertical Turbine-Multi Stage/Can pumps		
SPECIAL CONSTRUCTION MATERIAL:			
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):	600 HP; 480V; 3 ph		
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	VFD		
SPEED, RPM:	1775 rpm	MAXIMUM:	MINIMUM N/A
			:
ALARMS:	Provided by others	INTERLOCKS:	Provided by others
CONTROL:	Provided by others		
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	8/31/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Intermediate/Transfer Pumps		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Permeate Water (Stabilized)	# OF UNITS:	3 Initial – 1 Future
CAPACITY (Rate; Head)	4,050 gpm @ 60-ft		
MANUFACTURER; SIZE; CONFIGURATION:	Flowserve; 100 HP/74.6 kW; Vertical Turbine/Pumps		
SPECIAL CONSTRUCTION MATERIAL:			
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):	100 HP; 480V; 3 ph		
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	VFD		
SPEED, RPM:	1775 rpm	MAXIMUM:	MINIMUM N/A
			:
ALARMS:	Provided by others	INTERLOCKS:	Provided by others
CONTROL:	Provided by others		
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	8/31/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	High Service Pumps		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Finished Water	# OF UNITS:	3 Initial – 1 Future
CAPACITY (Rate; Head)	4,050 gpm @ 240-ft		
MANUFACTURER; SIZE; CONFIGURATION:	Flowserve; 350 HP/261 kW; Horizontal Split Case/Centrifugal		
SPECIAL CONSTRUCTION MATERIAL:			
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):	350 HP; 480V; 3 ph		
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	VFD		
SPEED, RPM:	1750 rpm	MAXIMUM:	MINIMUM N/A
			:
ALARMS:	Provided by others	INTERLOCKS:	Provided by others
CONTROL:	Provided by others		
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	2522	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	In-line Static Mixer		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Various at differing locations	# OF UNITS:	
CAPACITY (Rate; Head)			
MANUFACTURER; SIZE; CONFIGURATION:	Westfall Manufacturing, (1) 36-inch diameter; (6) 30-inch diameter , compact ring-type		
SPECIAL CONSTRUCTION MATERIAL:	For NaOH and lime water injections: 316 SS mounting ring, 0.8 BETA 316 SS mixer plate, brass corp stop with PVC solution tube and EPDM gaskets. For NaOCl and H ₂ SO ₄ application: 316 SWS mounting ring, 0.8 BETA Alloy -20 mixer plate, brass corp stops with Hastelloy solution tubes, Teflon gaskets		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	~400-450	LBS/EACH	NOISE LEVEL:	N/A	dBA
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Feeding System and Accessories		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Antiscalant	# OF UNITS:	1 duty/1 stand-by for main feed; 1 duty to scrubber drain
CAPACITY (Rate; Head)	2.9 gph main feed/feed rate to scrubber drain to be determined		
MANUFACTURER; SIZE; CONFIGURATION:	Grundfos DME 12-6, digital chemical metering pump		
SPECIAL CONSTRUCTION MATERIAL:	To be determined based on anti-scalant selected		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):	To be determined based on anti-scalant selected		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	Variable speed drive		
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBA
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Feeding System and Accessories		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Aqua Ammonium (19%)	# OF UNITS:	1 duty/1 stand-by
CAPACITY (Rate; Head)	6.1 gph		
MANUFACTURER; SIZE; CONFIGURATION:	Grundfos DME 48-3, digital chemical metering pump		
SPECIAL CONSTRUCTION MATERIAL:	Fittings – Malleable iron pipe or PVC		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):	Viton		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	Variable speed drive		
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Feeding System and Accessories		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Sodium Hydroxide (50%) solution (chemical scrubber manufacturer to provide separate metering pump for dosing which shall be Grundfos DME)	# OF UNITS:	1 duty/1 stand-by
CAPACITY (Rate; Head)	40 gph (20 gph NaOH + 20 gph carrier water)		
MANUFACTURER; SIZE; CONFIGURATION:	Grundfos DME-375-10, digital chemical metering pump		
SPECIAL CONSTRUCTION MATERIAL:	Fittings – PVC, gaskets - EPDM		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):	Gaskets - EPDM		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	Variable speed drive		
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):	Carrier water		

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Feeding System and Accessories		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Corrosion Inhibitor – (Zinc/Orthophosphate)	# OF UNITS:	1 duty/1 stand-by
CAPACITY (Rate; Head)	1 gph		
MANUFACTURER; SIZE; CONFIGURATION:	Grundfos DME 4-7, digital chemical metering pump		
SPECIAL CONSTRUCTION MATERIAL:			
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	Variable speed drive		
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/8/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Feeding System and Accessories		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Lime Slurry	# OF UNITS:	1 duty/1 stand-by
CAPACITY (Rate; Head)	240 gph		
MANUFACTURER; SIZE; CONFIGURATION:	Monoflo or Moyno, progressing cavity pump		
SPECIAL CONSTRUCTION MATERIAL:	300 stainless steel housing, chrome plated rotor, nitrile rotor		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Feeding System and Accessories		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Hydrofluosilicic Acid (23%)	# OF UNITS:	1 duty/1 stand-by
CAPACITY (Rate; Head)	3.0 gph		
MANUFACTURER; SIZE; CONFIGURATION:	Grundfos DME-19-6, digital chemical metering pump		
SPECIAL CONSTRUCTION MATERIAL:	Fittings – PVDF		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):	Gaskets – VITON or EPDM		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	Variable speed drive		
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Feeding System and Accessories		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Sodium Hypochlorite (12.5%)	# OF UNITS:	2 duty/1 stand-by; 1 duty for trim
CAPACITY (Rate; Head)	36.5 gph - process train / 17 gph for odor control scrubber		
MANUFACTURER; SIZE; CONFIGURATION:	Grundfos DME 375-10, digital chemical metering pump main feeds; Grundfos DME 48-3 for NaOCl trim		
SPECIAL CONSTRUCTION MATERIAL:	Fittings – PVC and CPVC (Schedule 80) or titanium		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):	Gaskets – Latharge Viton or EPDM		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	Variable speed drive		
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Feeding System and Accessories		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Sulfuric Acid (96%) solution	# OF UNITS:	1 duty/1 stand-by
CAPACITY (Rate; Head)	6.2 gph		
MANUFACTURER; SIZE; CONFIGURATION:	Grundfos DME 48-3, digital chemical metering pump		
SPECIAL CONSTRUCTION MATERIAL:	Fittings – HALAR		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):	Gaskets – Latharge Viton		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):	Variable speed drive		
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Storage Systems		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Antiscalant	# OF UNITS:	4 totes Phase 1/Add'l 2 Phase 2/Add'l 1 Phase 3
CAPACITY (Rate; Head)	300 gallons		
MANUFACTURER; SIZE; CONFIGURATION:	By chemical provider		
SPECIAL CONSTRUCTION MATERIAL:	By chemical provider/HDXLPE OR-1000		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):	Viton or EPDM		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBA
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Allow for proper and sufficient ventilation of tank contents based on chemical stored.

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Storage Systems		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Aqua Ammonium (19%) Solution	# OF UNITS:	1 tank
CAPACITY (Rate; Head)	10,000 gallons		
MANUFACTURER; SIZE; CONFIGURATION:	Tanner Industries		
SPECIAL CONSTRUCTION MATERIAL:	Carbon or stainless steel, Schedule 40 or 80 steel pipe, malleable iron fittings, 30 psi pressure rated, safety relief valve, vacuum breaker		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Tank must be closed to atmosphere and not be near any source of spark or ignition.

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME: City of Hialeah Reverse Osmosis Water Treatment Plant DATE: 9/1/09
SUBMITTAL: _____ ENGINEER: _____
FACILITY NAME: _____ PROJECT NO.: 260363.09000
EQUIPMENT NAME: Chemical Storage Systems
IDENTIFICATION NO.: _____
MATERIAL HANDLED: Sodium Hydroxide (50%) Solution # OF UNITS: 1 tank Phase 1/1
Additional Phase 2

CAPACITY (Rate; Head) 8,500 gallons

MANUFACTURER; SIZE; CONFIGURATION: PolyProcessing Company, circular vertical flat bottom tank

SPECIAL CONSTRUCTION MATERIAL: HDXLPE with integrated molded flanged outlet, PVC fittings

COATINGS (Manuf. Std; Special): _____

SEALS (Mech; Packing; Grease; Water): EPDM

POWER REQUIRED (HP; Voltage; Phase): See heat tracing provider

DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.): _____

SPEED, RPM: _____ MAXIMUM: _____ MINIMUM N/A
: _____

ALARMS: _____ INTERLOCKS: _____

CONTROL: _____

SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known): _____

Carrier water

EQUIPMENT WEIGHT: _____ LBS/EACH NOISE LEVEL: N/A dBA

MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Heat trace tank and all process pipelines to keep temperature of entire contents above 65 °F. Allow for proper and sufficient ventilation of tank contents based on chemical stored.

Accessories: _____

LOCATION OF EQUIPMENT:

Struct. Sht. No.: _____ P&ID Sht. No.: _____ HVAC Sht. No.: _____ Spec. Section: _____

Arch. Sht. No.: _____ Mech. Sht. No.: _____ Elec. Sht. No.: _____

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Storage Systems		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Corrosion Inhibitor – (Zinc/Orthophosphate)	# OF UNITS:	2 totes Phase 1/1 Add'l tote Phase 3
CAPACITY (Rate; Head)	300 gallons		
MANUFACTURER; SIZE; CONFIGURATION:	By chemical provider		
SPECIAL CONSTRUCTION MATERIAL:	By chemical provider/HDXLPE		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBA
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Allow for proper and sufficient ventilation of tank contents based on chemical stored.

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Storage Systems		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Hydrated Lime Slurry	# OF UNITS:	1 tank
CAPACITY (Rate; Head)	750 gallons		
MANUFACTURER; SIZE; CONFIGURATION:	By lime silo/slaker system provider		
SPECIAL CONSTRUCTION MATERIAL:	Mild carbon steel		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Storage Systems		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Hydrofluosilicic Acid (23%) Solution	# OF UNITS:	4 totes Phase 1/2 Add'l Phase 2/1 Add'l Phase 3
CAPACITY (Rate; Head)	350 gallons		
MANUFACTURER; SIZE; CONFIGURATION:	By chemical provider		
SPECIAL CONSTRUCTION MATERIAL:	By chemical provider/HDXLPE		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):	Viton or EPDM		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBA
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Allow for proper and sufficient ventilation of tank contents based on chemical stored.

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME: City of Hialeah Reverse Osmosis Water Treatment Plant DATE: 9/1/09
SUBMITTAL: _____ ENGINEER: _____
FACILITY NAME: _____ PROJECT NO.: 260363.09000
EQUIPMENT NAME: Chemical Storage Systems
IDENTIFICATION NO.: _____
MATERIAL HANDLED: Sodium Hypochlorite (12.5%) Solution # OF UNITS: 2 tank Phase 1/1 Add'l
Phase 2/1 Add'l Phase 3

CAPACITY (Rate; Head) 5,100 gallons

MANUFACTURER; SIZE; CONFIGURATION: PolyProcessing Company, circular vertical flat bottom tank

SPECIAL CONSTRUCTION MATERIAL: HDXLPE with integrated molded flanged outlet, PVC (Sch 80) fittings

COATINGS (Manuf. Std; Special): OR-1000 liner/tank oxidation reduction system

SEALS (Mech; Packing; Grease; Water): Latharge Viton or EPDM

POWER REQUIRED (HP; Voltage; Phase): _____

DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.): _____

SPEED, RPM: _____ MAXIMUM: _____ MINIMUM N/A
: _____

ALARMS: _____ INTERLOCKS: _____

CONTROL: _____

SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known): _____

Carrier water

EQUIPMENT WEIGHT: _____ LBS/EACH NOISE LEVEL: N/A dBA

MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

DO NOT USE STAINLESS STEEL.

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.: _____ P&ID Sht. No.: _____ HVAC Sht. No.: _____ Spec. Section: _____

Arch. Sht. No.: _____ Mech. Sht. No.: _____ Elec. Sht. No.: _____

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Chemical Storage Systems		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Sulfuric Acid (96%) Solution	# OF UNITS:	1 tank
CAPACITY (Rate; Head)	4,900 gallons		
MANUFACTURER; SIZE; CONFIGURATION:	PolyProcessing Company, circular vertical flat bottom tank		
SPECIAL CONSTRUCTION MATERIAL:	HDXLPE with integrated molded flanged outlet		
COATINGS (Manuf. Std; Special):	OR-1000 liner/tank oxidation reduction system		
SEALS (Mech; Packing; Grease; Water):	Latharge Viton		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

DO NOT USE STAINLESS STEEL. Allow for proper and sufficient ventilation of tank contents based on chemical stored.

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Lime Storage and Feed Equipment System		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Bulk Hydrated Lime System	# OF UNITS:	1
CAPACITY (Rate; Head)	75 ton silo/1,000 gallon slurry tank		
MANUFACTURER; SIZE; CONFIGURATION:	Stanco or Chemco Systems, 12-feet diameter silo		
SPECIAL CONSTRUCTION MATERIAL:	Welded carbon steel skirt supported silo		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dB A
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

System to process at Phase 1 2,500 ppd hydrated lime into a lime slurry to be piped to lime saturator system. The hydrated lime silo system shall include necessary components including, but not limited to, hydrated lime storage silo, bin vent filter, silo level sensors, flow promotion devices, a rotary airlock valve, transition hopper, volumetric feeder, lime slurry tank, slurry tank mixer, transport pumps, piping and valves, control system and accessories.

Accessories: Lightning protection for silo, insulation and cladding of silo skirt area, skirt exhaust fan, skirt electric heater, shower and eyewash assembly, air compressor and refrigerated dryer for system component operation, lighting for the skirt area and spare parts for two years operation at design rate.

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Odor Control System		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Degasifier system off-gas	# OF UNITS:	1 per degasifier tower
CAPACITY (Rate; Head)	8,000 cfm (normal) to 16,000 cfm (high) @ 100 ppm avg H ₂ S inlet concentration		
MANUFACTURER; SIZE; CONFIGURATION:	Siemens LO/PRO 6000, multi-stage, once-through packaged chemical scrubber system, 99.5% removal; use Grundfos DME metering pumps for NaOH and NaOCl feed		
SPECIAL CONSTRUCTION MATERIAL:	FRP w/UV inhibitor		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):	Stage 1 recirc pump=7 HP, Stage 2 recirc pump= 7HP, Air supply fan=20 HP, 2 chemical metering pumps= ~1 hp each		
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
	:		
ALARMS:		INTERLOCKS:	
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT: <u>25,500 oper. Wt. LBS/EACH</u>	NOISE LEVEL: <u>N/A</u> dBA
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Make-up water hardness must be less than 100 ppm CaCO₃ or a water softener must be utilized for that stream.

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME: City of Hialeah Reverse Osmosis Water Treatment Plant DATE: 9/1/09
SUBMITTAL: _____ ENGINEER: TCN
FACILITY NAME: _____ PROJECT NO.: 260363.09000
EQUIPMENT NAME: Carbon Dioxide Pressurized Solution Feed System
IDENTIFICATION NO.: _____
MATERIAL HANDLED: Carbon dioxide feed system # OF UNITS: 1 system
CAPACITY (Rate; Head) 50 ton carbonic acid storage/20-200 lb/hr carbonic acid
design feed rate

MANUFACTURER; SIZE; CONFIGURATION: TOMCO₂ complete PSF (pressurized solution feed) system
SPECIAL CONSTRUCTION MATERIAL: Storage tank – welded steel pressure vessel, Section VIII Div. 1 ASME
COATINGS (Manuf. Std; Special): _____
SEALS (Mech; Packing; Grease; Water): _____
POWER REQUIRED (HP; Voltage; Phase): _____
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.): _____
SPEED, RPM: _____ MAXIMUM: _____ MINIMUM N/A
: _____
ALARMS: _____ INTERLOCKS: _____
CONTROL: _____
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known): _____

EQUIPMENT WEIGHT: LBS/EACH NOISE LEVEL: N/A dBA

MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Storage tank to be capable of holding 100,000 lbs liquid carbon dioxide at 300 psig and 0°F. Include electric vaporizer, vapor heater, first stage pressure regulator, PSF carbonic acid feed system (one per injection point) and carbonic acid diffusers and all ancillary equipment necessary as determined by manufacturer.

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.: _____ P&ID Sht. No.: _____ HVAC Sht. No.: _____ Spec. Section: _____
Arch. Sht. No.: _____ Mech. Sht. No.: _____ Elec. Sht. No.: _____

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	8/31/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Turbocharger		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Raw Water	# OF UNITS:	
CAPACITY (Rate; Head)			
MANUFACTURER; SIZE; CONFIGURATION:			
SPECIAL CONSTRUCTION MATERIAL:	Duplex Stainless Steel Alloy 2205		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dB A
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Casings are designed for a maximum of 600 psi operating pressure.

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Cartridge filters		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Raw influent after sulfuric acid and antiscalant injection	# OF UNITS:	176 per cartridge vessel/Phase 1-880, Phase 3/1,408
CAPACITY (Rate; Head)	4 gpm/10-inch (all vessels in service – 5 gpm/10-inch (1 vessel out of service), 5 micron		
MANUFACTURER; SIZE; CONFIGURATION:	Parker Fulflo EcoBond, 40-inch length		
SPECIAL CONSTRUCTION MATERIAL:	Meltblown polypropylene		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):	Double o-ring, single open end type		
POWER REQUIRED (HP; Voltage; Phase):			
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBA
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	9/1/09
SUBMITTAL:		ENGINEER:	TCN
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Degasifier System and Accessories		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Permeate	# OF UNITS:	2 Phase 1/2 add'l Phase 2
CAPACITY (Rate; Head)	5 mgd each tower		
MANUFACTURER; SIZE; CONFIGURATION:	Siemens DG-1200 single-pass, forced draft, packed bed degasifier system, 95% H ₂ S removal efficiency		
SPECIAL CONSTRUCTION MATERIAL:	FRP w/UV inhibitor, NSF 61 or FDA certified		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):	20 HP air supply fan with inlet filter		
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dB/A
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

Provide recirculating cleaning system to allow for periodic cleaning of the packed media with NaOCl or other cleaning agent and discharge to sanitary sewer equalization tank.

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME: City of Hialeah Reverse Osmosis Water Treatment Plant DATE: 8/31/09
SUBMITTAL: _____ ENGINEER: _____
FACILITY NAME: _____ PROJECT NO.: 260363.09000
EQUIPMENT NAME: Reverse Osmosis Membrane Element and Vessel
IDENTIFICATION NO.: _____
MATERIAL HANDLED: Raw Water # OF UNITS: 60 vessels per skid
CAPACITY (Rate; Head) Production flow rate = 10200 gpd per element, 7 elements
per vessel

MANUFACTURER; SIZE; CONFIGURATION: 8-inch spiral element, surface area per element 400 ft²; dimension 8 " x 40"

SPECIAL CONSTRUCTION MATERIAL: _____

COATINGS (Manuf. Std; Special): Acrylic Urethane (white standard) for vessel

SEALS (Mech; Packing; Grease; Water): U-cup seal

POWER REQUIRED (HP; Voltage; Phase): Max operation pressure = 600 psi, Max pressure drop per element = 20 psi

DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.): _____

SPEED, RPM: _____ MAXIMUM: _____ MINIMUM N/A
: _____

ALARMS: _____ INTERLOCKS: _____

CONTROL: _____

SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known): _____

EQUIPMENT WEIGHT: _____ LBS/EACH NOISE LEVEL: N/A dBA

MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.: _____ P&ID Sht. No.: _____ HVAC Sht. No.: _____ Spec. Section: _____

Arch. Sht. No.: _____ Mech. Sht. No.: _____ Elec. Sht. No.: _____

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	8/31/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Clean Pump, Clean-In-Place System		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Cleaning Solution	# OF UNITS:	2
CAPACITY (Rate; Head)	800 gpm		
MANUFACTURER; SIZE; CONFIGURATION:			
SPECIAL CONSTRUCTION MATERIAL:			
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):	25 HP		
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

EQUIPMENT DATA SHEET

PROJECT NAME:	City of Hialeah Reverse Osmosis Water Treatment Plant	DATE:	8/31/09
SUBMITTAL:		ENGINEER:	
FACILITY NAME:		PROJECT NO.:	260363.09000
EQUIPMENT NAME:	Cleaning Tank, CIP System		
IDENTIFICATION NO.:			
MATERIAL HANDLED:	Cleaning Solution	# OF UNITS:	2
CAPACITY (Rate; Head)	3200 gal		
MANUFACTURER; SIZE; CONFIGURATION:	Vertical		
SPECIAL CONSTRUCTION MATERIAL:	FRP		
COATINGS (Manuf. Std; Special):			
SEALS (Mech; Packing; Grease; Water):			
POWER REQUIRED (HP; Voltage; Phase):	N/A		
DRIVE (Elect, Var.-Mech., Var-Belt, Const-Belt, Va.-Direct, etc.):			
SPEED, RPM:	MAXIMUM:	MINIMUM	N/A
		:	
ALARMS:	INTERLOCKS:		
CONTROL:			
SUPPORT UTILITIES REQUIRED (Seal Water, Comp, Air, Drains, Etc.) (qty. if known):			

EQUIPMENT WEIGHT:	LBS/EACH	NOISE LEVEL:	N/A	dBa
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MISCELLANEOUS COMMENTS, DATA AND INFORMATION (Vibration, Equipment Pads, Types, Sizes, Special Electrical, Structural, etc):

Accessories:

LOCATION OF EQUIPMENT:

Struct. Sht. No.:	P&ID Sht. No.:	HVAC Sht. No.:	Spec. Section:
Arch. Sht. No.:	Mech. Sht. No.:	Elec. Sht. No.:	

REVISION No.	REVISION DATE	REVISION DESCRIPTION	REVISION BY	APPROVED BY

ADDITIONAL COMMENTS:

SECTION 12360 - LABORATORY CASEWORK

1.1 PERFORMANCE REQUIREMENTS

1.2 QUALITY ASSURANCE

- A. Product Standard: SEFA 8, "Laboratory Furniture - Casework, Shelving and Tables - Recommended Practices."
- B. Flammable Liquid Storage Cabinets: NFPA 30.

1.3 MATERIALS

- A. Metal Cabinet Doors:
 - 1. Flush metal.
 - 2. Glazed with clear laminated tempered glass.
- B. Plastic-Laminate Cabinets:
 - 1. FSC-certified wood materials.
 - 2. Urea-formaldehyde free.
 - 3. Cabinet Interior: Thermoset decorative panels.
 - 4. Steel drawer pans.
 - 5. Hardwood drawer bodies.
- C. Utility-Space Framing: Steel framing units consisting of 2 slotted channels connected at top and bottom by U-shaped brackets.
- D. Laboratory Casework System: Integrated system that includes support framing, suspended modular cabinets, filler and closure panels, [**wall panels,**] [**undercabinet task-lighting fixtures,**] countertops, and fittings needed to assemble system.
- E. Hardware:
 - 1. Pulls: Back mounted.
 - 2. Heavy-duty drawer slides.
 - 3. Label Holders: On all drawers.
 - 4. Drawer and Door Locks: On all drawers and doors.
 - 5. Adjustable wall shelf supports.
- F. Countertops:
 - 1. Plastic Laminate: Applied to 1-inch- (25-mm-) thick core.
 - a. Construction: Flat.
 - b. Plastic Laminate: Chemical resistant.
 - c. Core: Urea-formaldehyde free.

2. Stainless Steel: Type 304, with coved backsplash.

G. Table Tops:

1. Plastic Laminate: Applied to 1-inch- (25-mm-) thick core.
 - a. Plastic Laminate: Chemical resistant.
 - b. Core: Urea-formaldehyde free.

H. Shelves:

1. Plastic laminate, applied to 3/4-inch- (19-mm-) thick urea-formaldehyde-free core.
2. Stainless steel.

I. Sinks:

1. Stainless steel.
2. Cup Sinks: Stainless steel.
3. Troughs: Stainless steel.

J. Accessories:

1. Reagent shelves.
2. Burette rods.
3. Upright rod assembly and metal crossbar.
4. Greenlaw arm assembly.
5. Lattice assembly.
6. Pegboards.

K. Water and Laboratory Gas Service Fittings: Chromium plated unless otherwise indicated.

L. Electrical Service Fittings:

1. Receptacles: General grade.
2. GFCI Receptacles: General grade.
3. TVSS Receptacles: General grade.
4. Cover Plates: Stainless steel.

1.4 SERVICE-FITTING SCHEDULE

A. Water Service Fittings:

1. Type: Swing-spout mixing faucets.
2. Outlet:
3. Mounting: Wall mounted.

B. Laboratory Gas Service Fittings:

1. Services: Air, Gas (fuel gas) Vacuum.
2. Type: Flange type.
3. Outlets: Three
4. Valve Type: Needle valve.

- C. Electrical Service Fittings: As determined by the Electrical Engineer.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 12360

SECTION 12485 - FOOT GRILLES**1.1 SUMMARY**

- A. Recessed foot grilles and frames.

1.2 COMPONENTS

- A. Aluminum Foot Grilles:
 - 1. Top Surface: Abrasive grit in epoxy matrix.
 - 2. Aluminum Finish: Powder coat finish- city engineer to select from manufacturer color selection.
- B. Frame: Same material and finish as foot grille.
- C. Support System: Extruded-metal support system for drainage pit applications.
- D. Drain Pans: Aluminum.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 12485

SECTION 12494 - ROLLER SHADES**1.1 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: Passes NFPA 701.
- B. Motorized Operators: UL listed.
- C. Comply with WCMA A 100.1.
- D. Mockups for each form of construction.

1.2 PRODUCTS

- A. Shade Band Material: PVC-coated fiberglass and polyester blends.
- B. Bottom Hem: Straight.
- C. Rollers: Electrogalvanized or epoxy primed steel or extruded-aluminum tube.
- D. Top: Pocket-style headbox with bottom cover.
- E. Shade Type: Audiovisual light blocking.
- F. Shade Operation: Manual with continuous-loop bead chain, clutch, and cord tensioner and bracket.
- G. Valance.
- H. Mounting: Inside, Recessed in ceiling pocket.
- I. Hold-down brackets and hooks or pins and side channels.

1.3 INSTALLATION

- A. Factory-authorized representative to provide demonstration services for motorized operating system.

2.0 SUBMITTALS

- A. Submit shop drawings and material samples to Contract Administrator with copy to City Engineer for approval in accordance with Appendix 5 of the Service Contract.

END OF SECTION 12494

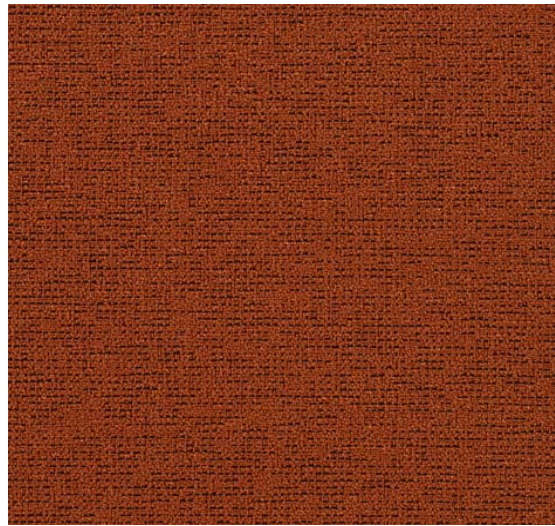
SECTION 12600
FURNITURE AND ACCESSORIES

CUT SHEETS FOLLOW

FURNITURE SPECS

SIDE CHAIR FOR CLOSED OFFICES

ARCH FIRM: LEO A. DALY



Finish Tag: S-1

Manufacturer: Herman Miller

Style: Aside

Color for frame: Metallic Silver (MS). Seat and Back Fabric: Twist Cayenne (8R09)

Approx. List Price: Starting at \$400

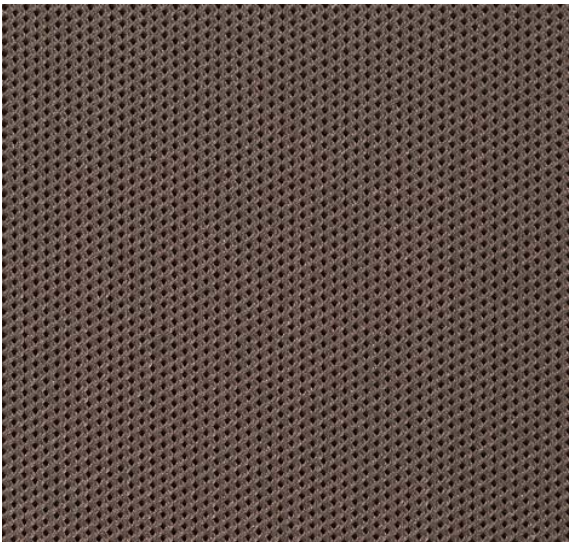
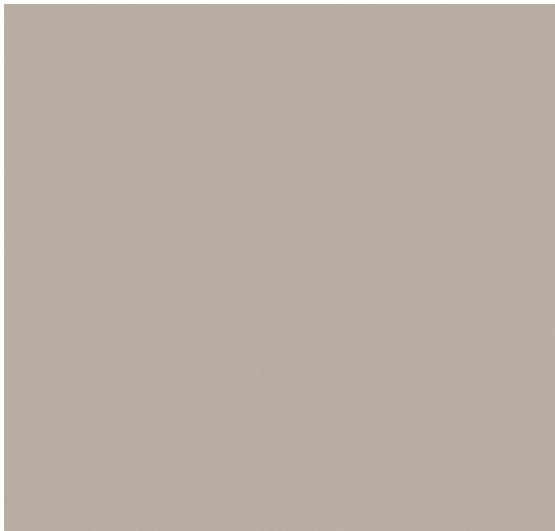
CITY OF HIALEAH, FLORIDA
REVERSE OSMOSIS WATER TREATMENT
DESIGN CRITERIA PACKAGE



FURNITURE SPECS

TASK CHAIR FOR CLOSED AND OPEN OFFICES

ARCH FIRM: LEO A. DALY



Finish Tag: S-2
Manufacturer: Herman Miller
Style: Celle Chair
Color for base, frame and arms: Brownstone (3G), Back: Champagne (DM), Seat Cushion Fabric: Latitude Capuccino (8M06)
Approx. List Price: Starting at \$700



FURNITURE SPECS

CONFERENCE ROOM CHAIR

ARCH FIRM: LEO A. DALY



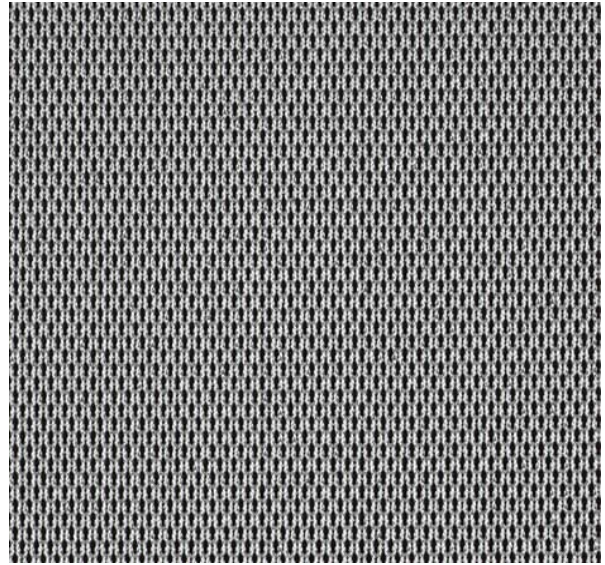
Finish Tag: S-3
Manufacturer: Steelcase
Style: Scout Chair
Color for base, frame and arms: Polished Aluminum, Seat and back Vinyl: Savoy, Copper Clay
Approx. List Price: Starting at \$900



FURNITURE SPECS

BREAKROOM CHAIR

ARCH FIRM: LEO A. DALY



Finish Tag: S-4

Manufacturer: Herman Miller

Style: Caper Chair

Color for base, frame and arms: Metallic Silver (MS). Seat and Back: Salsa Red (SX), Flexnet seat: Silver gray (6V02)

Approx. List Price: Starting at \$400

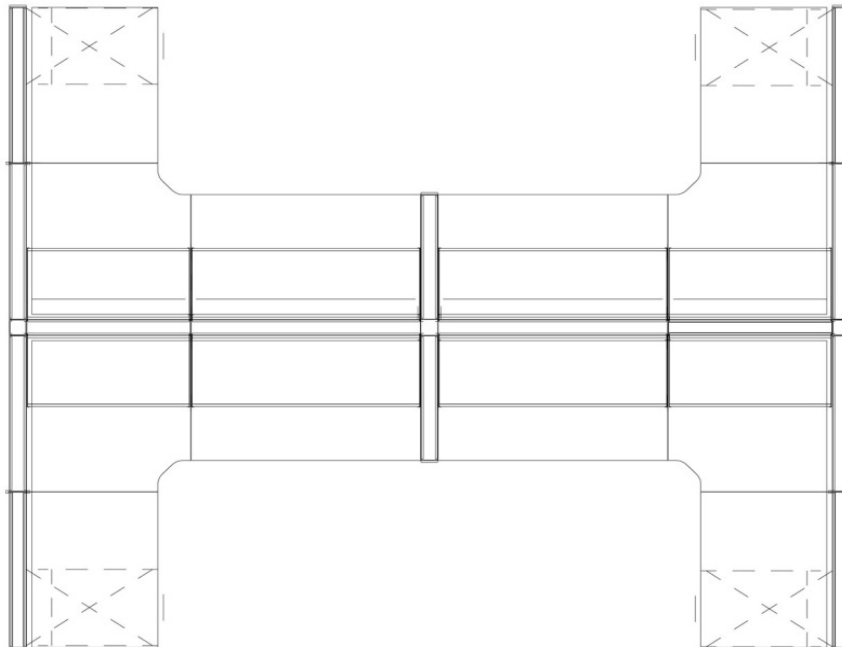
CITY OF HIALEAH, FLORIDA
REVERSE OSMOSIS WATER TREATMENT
DESIGN CRITERIA PACKAGE



FURNITURE SPECS

WORKSTATION SPECIFICATION

ARCH FIRM: LEO A. DALY



Finish Tag: W-1

Manufacturer: Herman Miller

Style: Vivo

Color: see attached furniture finishes and colors

*Top Photo for reference only. Contact Herman Miller Rep for complete specification

CITY OF HIALEAH, FLORIDA
REVERSE OSMOSIS WATER TREATMENT
DESIGN CRITERIA PACKAGE

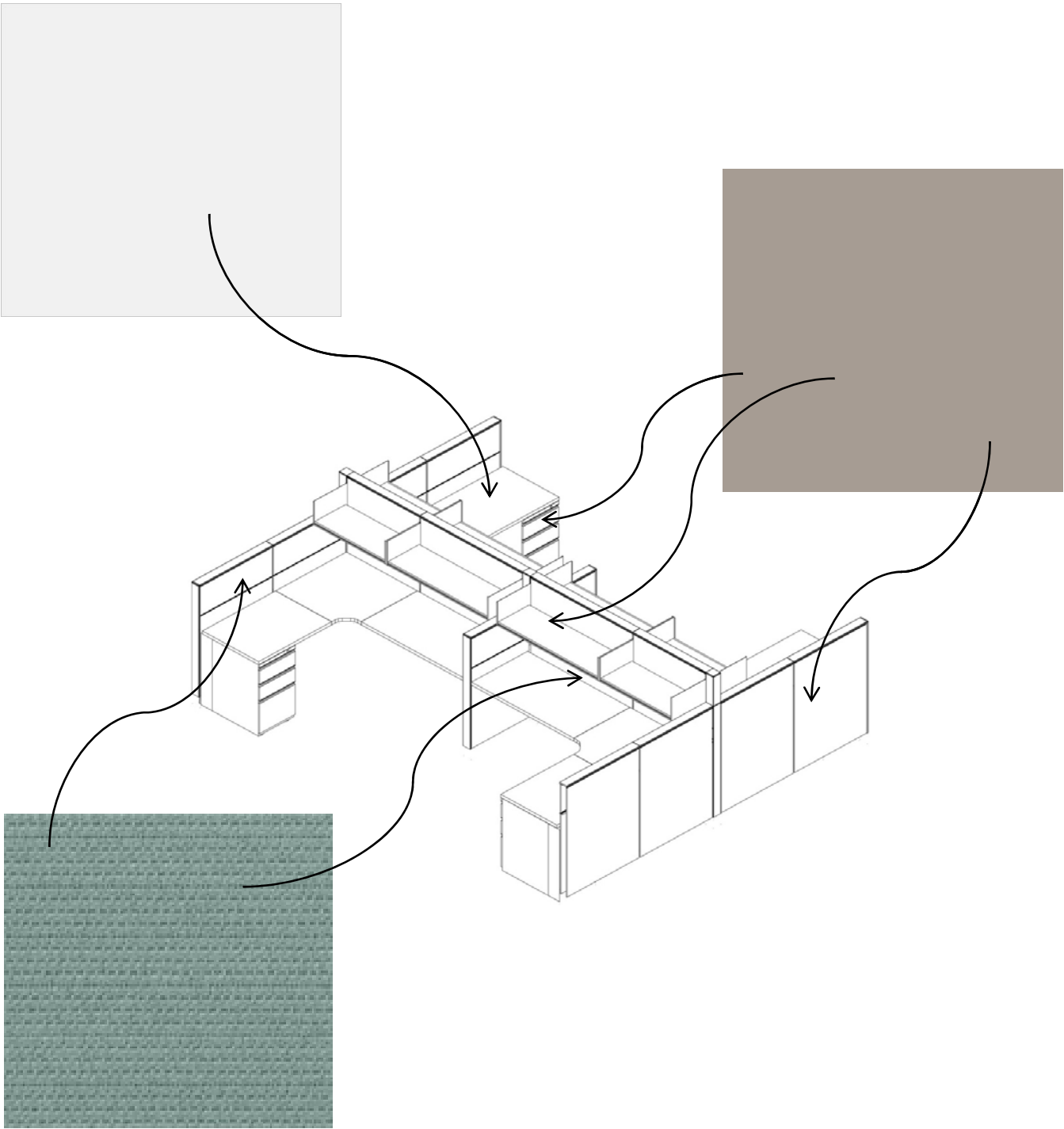


Approx. List Price: Starting at \$4,500

FURNITURE SPECS

WORKSTATION FINISHES

ARCH FIRM: LEO A. DALY



Finish Tag: WF-1
Manufacturer: Herman Miller
Style: Vivo
Colors: Base, frame and trim color: Warm Grey Neutral (WN), Inside Tackable Fabric tiles: Grossgrain Spa Blue 8408,
Work Surface: Soft White (LU)



Approx. List Price: Starting at \$4,200 per workstation.